2016

Factors Influencing Math and Science Teacher Intentions to Leave or Stay in the Teaching Profession

Scott Douglass

FACTORS INFLUENCING MATH AND SCIENCE TEACHER INTENTIONS TO LEAVE OR STAY IN THE TEACHING PROFESSION

A Dissertation

Presented to

The Faculty of Lynchburg College

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education (Ed.D.)

by

Scott Douglass, B.S., M.Ed.

March 22, 2016

Lynchburg College
Lynchburg, Virginia

APPROVAL OF DISSERTATION

This dissertation, Factors Influencing Math and Science Teacher Intensions to Leave or Stay in the Teaching Profession, has been approved by the Ed.D Faculty of Lynchburg College in partial fulfillment of the requirements for the Ed.D degree.

Dr. Sally Selden, Chair

Dr. Roger E. Jones, Committee Member

Dr. Stephen C. Smith, Committee Member

4/8/16
Date

Dedication

To Michelle, Riley, Taylor and Isabella
for their support throughout this journey.

Acknowledgements

I am very grateful for the support and encouragement from my family and friends who motivated and inspired me to complete this program that began three years ago. My family was incredibly supportive and made sacrifices which allowed me to make the most of this opportunity. I am also thankful to my colleagues that have supported, encouraged, and offered advice over the last few years.

Special thanks to Dr. Sally Selden, my committee chair, for her countless hours helping and encouraging me throughout this process. Also, I really appreciate all of the guidance and wisdom from Dr. Roger Jones, my committee member and advisor, who has been my instructor and a mentor for many years. I would like to also thank Dr. Stephen Smith, my committee member and Director, for his role as a mentor, leader, and friend, always encouraging and keeping me on track.

I was also fortunate to have a supportive cohort group that also kept Mondays interesting. I would like to thank two people, outside of the committee, that have spent hours reading and editing my dissertation multiple times. Dr. Charlie Jones, a colleague and friend, who has served as an editor. Finally, Mrs. Michelle Douglass, my wife, colleague, editor, friend, and inspiration without whom none of this would have been possible.

Table of Contents

Dedication iv
Acknowledgements v
Table of Contents vi
Abstract ix
Chapter 1: Introduction 1
Importance of this Study 1
Statement of Problem 1
Purpose 3
Research Questions & Hypotheses 5
Significance of the Study 8
Conceptual Framework 8
Figure 1.1 Conceptual Model 10
Summary of Methodology 10
Limitations 11
Proposal Organization 11
Chapter Summary 12
Chapter 2: Review of the Literature 13
Introduction 13
Literature Selection Method 15
Why Teachers Leave the Profession 15
Table 2.1 35
Why Teachers Stay 38
Table 2.2 48
Summary of the Literature 50
Chapter 3: Research Methods 52
Figure 3.1 Conceptual Model 53
Measurement of Independent and Dependent Variables 54
Sample 61
Survey Procedures 62

Table 3.1 62
Data Analysis 63
Summary 63
Chapter 4: Analysis of Data 65
Introduction 65
Demographics: Description of Survey Respondents 66
Table 4.1 66
Measurement of Variables in the Model 66
Independent Variables 66
Table 4.2 68
Dependent Variables 71
Table 4.3 72
Table 4.4 74
Correlation Analyses 74
Table 4.5 74
Table 4.6 75
Multivariate Analyses Examining Study's Model 75
Table 4.7 77
Table 4.8 79
Table 4.9 81
Table 4.10 83
Summary 83
Table 4.11 86
Chapter 5: Discussion of Findings and Recommendations 87
Key Issues from the Literature & Problem Statement 87
Research Questions 87
Qualitative Responses 93
Conclusions and Implications 94
Limitations 95
Suggestions for Future Research 96
References 97
Appendix 102

APPENDIX A: Institutional Review Board Approval 102
APPENDIX B: Message to Administrators 104
APPENDIX C: Informed Consent Agreement 105
APPENDIX D: Survey Questions 107

Abstract

Scott T. Douglass

Dr. Sally Selden, Chair

Dr. Roger E. Jones, Advisor and Committee Member

Dr. Stephen C. Smith, Committee Member

The K-12 teaching occupation suffers from chronic and high turnover compared to most other occupations which suggests an underlying problem. The U.S. Department of Education nationwide listing of teacher shortage areas consistently includes secondary math and science teachers. The purpose of this study was to identify factors that have the greatest influence on math and science teacher intentions to stay in or leave the teaching profession. The independent variables included in this study were: perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress associated with teaching. A survey was sent to math and science teachers in central Virginia containing questions largely derived from the School and Staffing Survey. The study first describes the data using descriptive statistics. Next, the study explains how the independent and dependent variables were measured and presents the reliability analyses (Cronbach's Alpha) of the indices used in the study. Bivariate correlations, using the Pearson Coefficient to determine the relationships between key constructs and variables in the study, were also examined. The first dependent variable analyzed was job satisfaction which was then included as an

independent variable to analyze the final dependent variable of teacher intentions to stay in or leave the teaching profession. The study presents the multivariate analysis or Ordinary Least Squares linear regression results examining the study's model. The three independent variables of perceived administrative support, salary satisfaction, and stress associated with teaching, were all significant predictors of job satisfaction among math and science teacher participants in central Virginia. Stress associated with teaching and job satisfaction were significant predictors of intent to stay in teaching for teachers. Based on the results of this study, resources should be targeted to improve job satisfaction and decrease stress associated with teaching to improve the retention of qualified math and science teachers. The improvement of job satisfaction would be best served, based on the analyses of this study, by improving perceived administrative support, improving salary satisfaction, and decreasing stress associated with teaching.

Chapter 1: Introduction

Importance of this Study

Education is a pillar of any society because of its role to educate and prepare people to meet the challenges of a dynamic world. In the United States there is growing criticism concerning education, which highlights the need for continued research in the field. Research has suggested that the single most influential factor in the education of children is the teacher (Ingersoll, 2001; Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). The K-12 teaching occupation has chronic and high turnover compared to most other occupations, which suggests that the teaching profession has underlying problems (Ingersoll & Smith, 2003). The purpose of this study was to examine factors that influence teacher intentions to remain in or leave the teaching profession. Determining the factors that most influence math and science teachers' intents to stay in or leave the teaching profession allows school leadership to prioritize their resources to better address the retention of qualified math and science teachers. Retaining qualified math and science teachers creates stability and ostensibly will have a positive impact on student learning and achievement.

Statement of Problem

Specific areas of educational have received more attention, in part, because of the difficulty maintaining qualified and experienced faculty in certain subject areas deemed "high need." The United States Department of Education has identified teacher shortage

areas in their nationwide listings each year, and those listings have consistently included secondary math and science (U.S. Department of Education, 2013). Turnover in these two "high need" areas in education is a significant and wide-spread issue across school districts in the United States (Tai, Liu & Fan, 2007). According to surveys by the National Center for Education Statistics (NCES), including the School and Staffing Survey (SASS), and the Teacher Follow-Up Survey (TFS), a significant number of schools report serious problems staffing their math and science teacher positions (Ingersoll, & Perda, 2010). Accompanying an ever-increasing need to fill positions and retain qualified teachers in all areas, the shortage of qualified science teachers has been an even more pressing problem at all levels of the educational system (Luft, Wong & Semken, 2011). Of additional concern is that the teacher shortage in math and science is occurring at the same time the United States has been shown to be lagging behind other developed nations in math and science education according to Programme for International Student Assessment (PISA) and Trends in International Mathematics and Science Study (TIMSS), (Tienken, 2013).

According to a study by Curtis (2012), high teacher turnover created an unstable educational atmosphere, which adversely affected student achievement. According to Shen (2001), higher rates of teacher attrition disrupted program continuity and planning, as well as hindered student learning. Experienced teachers make the best teachers – however, beginning teachers are leaving at a startling 33% in the first 3 years and 46% after five years, which makes it difficult to build a strong base of experienced teachers (Brill & McCartney, 2008). In addition to the direct and negative impact on student learning and achievement, high teacher turnover results in increased expenditures for the

recruitment and training of new teachers (Curtis, 2012; Shen, 2001). When schools must spend more money on recruiting and training new teachers, less money is available for other resources. Thus, high rates of teacher turnover disrupts program planning and continuity, hinders student learning, and increases school districts' expenses on recruiting, hiring, and training (Shen, 2001).

The purpose of maintaining the most qualified teachers is to provide the best possible education for students. If qualified teachers are recruited and hired, but not retained, the quality of education provided to students suffers. Therefore, if the United States is to improve education in the areas of math and science, it is crucial that the staffing challenges for qualified math and science teachers be examined and subsequently addressed.

Purpose

Many studies have focused on recruitment to meet the high demand for qualified math and science teachers in the classroom. However, some studies indicated that the bigger issue is the retention of teachers (Ingersoll, 2001; Cochran-Smith, 2004). In a study conducted by Ingersoll (2001), data collected using the SASS and its supplement, the TFS, concluded that voluntary teacher turnover was a significant phenomenon. The findings indicated it is not the rising enrollments of students or teacher retirements that are to blame for the staffing challenges. Instead, the problems were due to excessive demand resulting from a "revolving door" where a large number of teachers depart their jobs for other reasons (Ingersoll, 2001). A study by Cochran-Smith (2004) also found that the staffing issues did not lie with retirements or teacher recruitment, but teacher retention. According to Ingersoll and Smith (2003), focusing on recruitment, though

worthwhile, will not solve the teacher staffing problems that schools face, since a larger part of the problem is voluntary teacher departures from the teaching profession.

The teacher shortage is, in part, a demand problem that can only be solved if demand is decreased by increasing teacher retention. There have been periodic teacher shortages over the past century, and policy-makers have responded by stepping up teacher recruitment efforts and issuing temporary teaching credentials to individuals who didn't meet the qualifications for teacher licensure. However, the current teaching certification environment is different than in past decades because now teachers have to be "highly qualified." The Elementary and Secondary Education Act requires all teachers of core academic subjects to be "highly qualified." This federal law defines a highly qualified teacher as a teacher who is fully licensed by the state, has at least a bachelor's degree and who has demonstrated competency in each subject taught. In Virginia, additional state licensure regulations require new teachers to far exceed the federal highly qualified standard (Virginia Department of Education, 2012). Although these requirements were intended to strengthen the education system by ensuring qualified teachers are in the classrooms, it makes becoming a qualified teacher more difficult. The result is that there are fewer qualified teachers in the core areas of math and science, which are already considered "high need." Having fewer highly qualified teachers in the areas of math and science entering the profession, coupled with high turnover has contributed to the national teacher shortage in these areas (Ingersoll, 2001). This means it has become more critical than ever to support and retain qualified math and science teachers to effectively address the shortage of qualified math and science teachers in our schools.

Researchers, Ingersoll & Perda (2010), found that the major factor for math and science teacher turnover was their dissatisfaction with aspects of their schools. Dissatisfaction has been found to be a significant predictor for teachers' intentions to leave the profession (Ingersoll, 2001; Sedivy-Benton & Boden McGill, 2012). The purpose of this study is to better understand the factors that influence math and science teachers' job satisfaction and their decisions to stay in or leave the teaching profession. Other studies have also identified factors that impact teacher job satisfaction (Fisher, 2011; Lopez, 2010) and have demonstrated a correlation with teacher job satisfaction and intent to stay in the teaching profession (Certo & Fox, 2002; Gardner, 2010). Research has converged around a set of factors related to dissatisfaction and turnover in K-12 teachers (Ingersoll, 2001; Sedivy-Benton & Boden McGill, 2012). Based upon this work, (Curtis, 2012; Ingersoll; 2001; Sedivy-Benton & Boden McGill, 2012; and Tai, Liu, & Fan, 2007) this study proposes to explore factors that are associated with the retention intentions of secondary math and science teachers for a region in central Virginia.

Research Questions & Hypotheses

The research questions are designed to determine which of the identified factors (administrative support, influence over classroom and school policies and practices, salary satisfaction, and stress) are most influential in predicting secondary math and science teacher job satisfaction and teachers' intent to stay in the profession. Additionally, this study will examine the level to which teacher job satisfaction predicts teacher intentions to stay in the profession. The research questions for this proposed study are:

(a) Does perceived administrative support by secondary math and science teachers in Central Virginia significantly impact teacher job satisfaction?

(b) Does perceived influence over classroom and school policies and practices by secondary math and science teachers in Central Virginia significantly impact teacher job satisfaction?

(c) Does the salary satisfaction of secondary math and science teachers in Central Virginia significantly impact teacher job satisfaction?

(d) Does perceived stress by secondary math and science teachers in Central Virginia significantly impact job satisfaction?

(e) Does administrative support perceived by secondary math and science teachers in Central Virginia significantly impact teacher intent to stay in the education profession?

(f) Does perceived influence over classroom and school policies and practices by secondary math and science teachers in Central Virginia significantly impact teacher intent to stay in the education profession?

(g) Does the salary satisfaction of secondary math and science teachers in Central Virginia significantly impact teacher intent to stay in the education profession?

(h) Does perceived stress by secondary math and science teachers in Central Virginia significantly impact teacher intent to stay in the education profession?

(i) Does the job satisfaction by secondary math and science teachers in Central Virginia significantly impact teacher intent to stay in the education profession?

Each of the four factors (perceived administrative support, influence over classroom and school policies and practices, salary satisfaction, and stress) will serve as independent variables and the job satisfaction and teacher intent to stay will be dependent variables. Teacher job satisfaction will also be analyzed as an independent variable to predict teacher intention to stay in the education field among these math and science teachers. The hypotheses for this study are as follows:

H_1 – Teacher perception of administrative support will be positively associated with job satisfaction.

H_2 – Teacher perception of influence over classroom and school policies and practices will be positively associated with job satisfaction.

H_3 – Greater teacher satisfaction with salary will be positively associated with job satisfaction.

H_4 – Greater perceived stress by teachers will be negatively associated with job satisfaction.

H_5 – Greater perceived administrative support will be positively associated with teacher intent to stay in teaching.

H_6 – Greater influence over classroom and school policies and practices will be positively associated with the intent to stay in teaching.

H_7 – Greater teacher satisfaction with salary will be positively associated with the intent to stay in teaching.

H_8 – Greater perceived stress by teachers will be negatively associated with the intent to stay in teaching.

H_9 – Greater job satisfaction will be positively associated with the intent to stay in teaching.

Significance of the Study

The potential significance of this research will be to provide information regarding reasons math and science teachers voluntarily leave teaching. The information may be used to help administrators and policy-makers prioritize resources to decrease turnover thereby, improving stability in schools. Decreasing voluntary turnover improves the educational environment for students making it more conducive to student learning and achievement.

Conceptual Framework

The conceptual model for this study includes four constructs that have been shown to have significant impacts on teacher job satisfaction and turnover intentions: administrative support, influence over classroom and school policies and practices, salary satisfaction, and stress (Boyd, et. al., 2012; Curtis, 2012; Fisher, 2011; Gardner, 2012; Greenlee & Brown, 2009; Hughes, 2012; Ingersoll 2001; Ingersoll & Smith, 2003; Kaufman & Al-Bataineh, 2011; Kersaint, Lewis, Potter & Meisels, 2006; Sedivy-Benton & Boden McGill, 2012; Tai, Liu, & Fan, 2007). The constructs were also selected because they are factors that administrators and school divisions are able to influence. Some factors identified in research, such as personal and family factors, as well as the school's student population of socio-economics, were eliminated from the model because school administrators and leadership cannot control those factors. The dependent variables are job satisfaction and teacher intent to stay in or leave the teaching profession.

Job satisfaction was also analyzed to determine its predictive power of teachers' intent to stay in the profession.

As shown in Figure 1.1, the four constructs (independent variables) were measured to determine their impact on job satisfaction (dependent variable) and teachers' intent to stay in the profession (dependent variable) for secondary math science teachers in a region of central Virginia. The four constructs were regressed to determine if they predicted job satisfaction. Each of the four factors was also be regressed to determine if they predict teacher intent to stay in the teaching profession. The model examined the direct and indirect impacts of each of the variables on teachers' intent to stay in the teaching profession. Research suggests that roots of teachers leaving the profession can be largely blamed on working conditions because of their impact on job satisfaction (Ingersoll & Smith, 2003). If working conditions impact job satisfaction for teachers and job satisfaction has been associated with job retention for teachers, then working conditions likely impacts teacher intentions to stay in teaching. As shown in Figure 1.1, the model also included an examination of the impact of job satisfaction (independent variable) on respondents' intent to stay in the education profession (dependent variable). The controls for this study included participants' age, gender, main teaching assignment, years of experience, and teaching certification. These controls were commonly used in many other related research studies (Curtis, 2012; Fisher, 2011; Ingersoll, 2001; Ingersoll & Smith, 2003; Sass, Flores, Claeys, & Perez, 2012; Sedivy-Benton & Boden McGill, 2012).

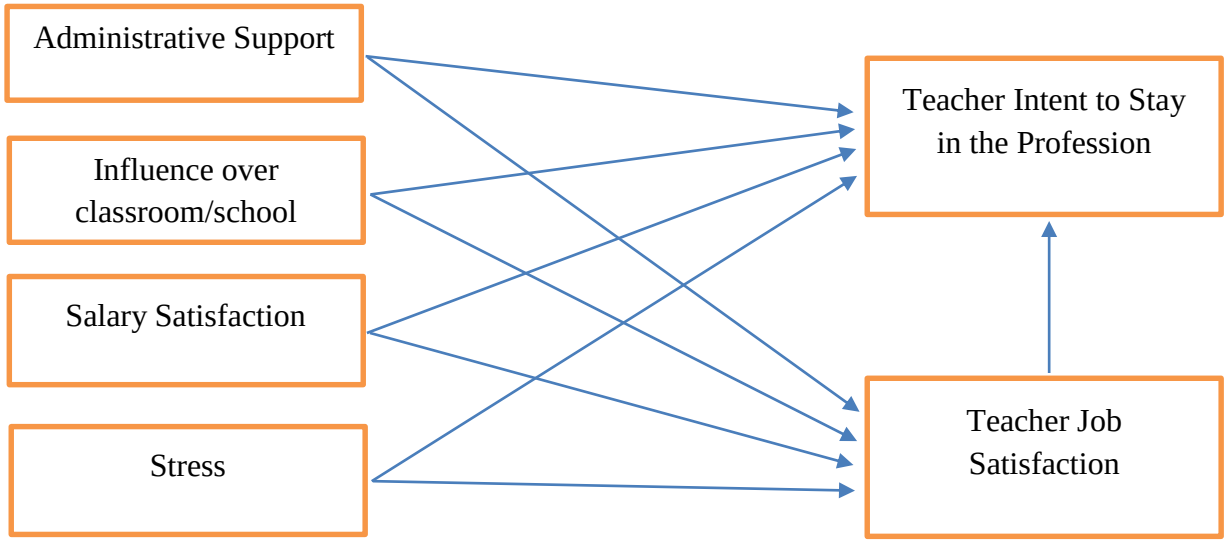

Figure 1.1 Conceptual Model

Summary of Methodology

This study employed a cross-sectional design surveying high school math and science teachers from five school districts, including the Governor's school designated to this region. There are 19 Governor's Schools across the Commonwealth that serve as specialized schools for gifted students. Each of the 19 Governor's Schools in Virginia represents a region in the Commonwealth. In total, math and science teachers from 10 high schools and one Governor's school were included in this sample with a total of approximately 170 potential teacher participants.

The researcher contacted each of the school divisions to gain permission to conduct the study. The survey link was then emailed to all potential participants to gather data. The instrument used questions primarily from the SASS, and the data analysis was completed using the Statistical Package for the Social Sciences, also known as SPSS. The

analysis consists of descriptive statistics, bivariate, regression analysis, and hierarchal linear modeling. The discussion and recommendations section interprets the analyses and provides a brief overview, including key findings. The goal of this research is to better identify those factors that have the greatest influence on math and science teachers' intent to stay in the profession.

Limitations

A limitation of this study is the convenience sample chosen is a single region in central Virginia which may limit generalizability to other localities. Furthermore, the survey is a one-time snapshot of teachers that are currently employed as math or science teachers at the high school level. The constructs were chosen because they were found to be significant in previous studies and were factors that could be influenced by administrators and school leadership. It is also possible that this study may have question bias.

Proposal Organization

The literature review section of this study examines research related to teacher retention to identify factors that impact teacher job satisfaction and teacher intent to stay in the profession. The literature review provides the underpinnings for this proposed study and frames the problem statement and hypotheses to be investigated. The methodology describes the researcher's basic approach to investigating the most influential factors in determining math and science teacher job satisfaction and intent to stay in the profession.

This research study employed quantitative analyses of survey responses from math and science teachers in a region in central Virginia to determine the variables that

have significant impacts on the teachers' job satisfaction and their intensions to stay in teaching. The instrument is a survey that was distributed electronically to approximately 170 potential participants currently employed at ten different high schools and the Governor's school in the chosen region.

Chapter Summary

This research adds to the growing body of knowledge concerning primary factors that influence secondary math and science teacher job satisfaction and intent to stay in or leave the profession. Identifying these factors may aid school leaders and policy makers in better utilizing their resources to maximize the impact they may have when addressing teacher shortages in the areas of math and science. The potential significance of this study will be to improve teacher retention in the areas of math and science, thereby, saving money and, more importantly, improving education for children.

Chapter 2: Review of the Literature

Introduction

Research studies on teacher turnover and retention have identified factors impacting teachers' intentions to stay in the teaching profession (e.g. Curtis, 2012; Ingersoll, 2001; 2011; Sedivy-Benton & Boden McGill, 2012). Some factors are outside of the control of administrators and school divisions. However, there are several factors by which school leadership may be able to positively influence a teacher's intent to stay in the profession (e.g. Greenlee & Brown, 2009; Hughes, 2012; Kaufman & Al-Bataineh, 2011).

In response to shortages of qualified teachers in "high need" content areas, many localities have resorted to creative solutions, such as offering financial incentives. According to David (2008), recruitment incentives are designed to entice teachers to work in schools by offering incentives including signing bonuses, student loan forgiveness, tuition reimbursement, and even assistance with relocation and housing costs. Financial incentives to improve teacher retention in certain content areas, and even to attract teachers to specific schools, have been used as well. In 2006 the Denver Public Schools adopted teacher incentive reforms to retain qualified teachers. The results suggested receiving the incentive was associated with a significant decrease in the odds a teacher would leave the school division (Fulbeck, 2014). From 2001 through 2004, the state of North Carolina offered an annual bonus of $1800 to math, science, and special education teachers who were willing to teach in low-income or low-performing schools

(David, 2008). Unfortunately, researchers noted weak implementation, minimal benefits to teachers, cumbersome rules for eligibility, and short duration (three years), as factors that undermined the potential effects. According to Berry (2004), 27 states offer scholarships or forgivable loans to prospective. However, keeping teachers appears to be a far larger problem than preparing new ones, and studies have suggested that focusing on teacher retention is a more promising approach than focusing on teacher recruitment for addressing the long-standing shortages of qualified math and science teachers (Ingersoll, 2001 & Cochran-Smith, 2004).

The following review of literature explores factors that impact teacher retention and turnover. The literature is first organized in two main categories, factors that influence a teacher's intent to leave and factors that influence a teacher's intent to stay in the teaching profession. Each main section is then broken down further based on the type of analysis. The first component of the first section begins with quantitative studies including both data about teachers that left the profession and data from current teachers. This is followed by a discussion of qualitative studies that gathered information about factors that impact teacher job satisfaction and intent to stay in the teaching profession. The second section focuses on studies regarding teacher retention factors. Again, the first component is a review of quantitative studies in which selected variables are measured to analyze their impact on job satisfaction and teacher retention. The final studies reviewed in this section use interviews with focus groups and administrators to determine the factors that most influence a teacher's intent to stay.

Literature Selection Method

The research studies included in this review were found using multiple search methods. One primary method for acquiring the relevant literature was using Lynchburg College's Knight-Capron Library's "LC OneSearch" to access all the materials available through the college. The search consisted of narrowing the field to all scholarly (peer-reviewed) journal, articles, reviews, reports, and dissertations/theses. The search included primarily sources provided by Education Resources Information Center (ERIC), but other providers were included as well. The researcher also used Google to search for relevant and scholarly sources to further explore related research. Search terms, which were used in a variety of combinations, included the following: teacher, retention, math, science, education, factors, influence, intent to leave, and intent to stay. The search was narrowed by relevance to factors that impact a teacher's intent to stay and further narrowed to include research published in the past 20 years. Follow-up searches included the following related terms identified in initial searches: administration, salary, control, stress, and job satisfaction. From this review of the scholarly literature, I identified the factors that surfaced most frequently and therefore, are likely to have the greatest impact on math and science teachers' job satisfaction and intent to stay in the profession.

Why Teachers Leave the Profession

Teachers leave the teaching profession for a variety of reasons so it is important to study the factors that have the greatest impact on teacher turnover. Once the factors that have the greatest influence on a teacher's decision to leave the profession are identified, administrators and policy makers can better prioritize their resources to address teacher

shortage. The first important step, then, is to determine why teachers in high needs areas leave the profession.

Most teachers go into the education profession with optimism, however, many experience unexpected challenges and difficult environments (Curtis, 2012). These unexpected challenges can contribute to dissatisfaction and result in qualified teachers leaving the profession. The literature reviewed explores reasons why teachers left or are considering leaving the teaching profession. As noted previously, key terms used when searching for literature on these topics included various combinations of the following terms: teacher turnover, factors, leaving teaching, teacher turnover influences, science, and math. The studies selected appeared most relevant to studying the factors that influence a teacher's intent to leave the teaching profession. Table 1 presents a summary of the studies reviewed in this section.

Ingersoll (2001) conducted a study using data from the School and Staffing Survey (SASS) and its supplement, the Teacher Follow-up Survey (TFS) from the National Center for Educational Statistics (NCES). This is the largest and most comprehensive data source available on the staffing and organizational aspects of K-12 education. The information from the three available cycles of the SASS (1987-1988, 1990-1991, and 1993-1994) were analyzed. The researcher used multilevel regression analysis to study existing data and included 6,733 participants that had left the teaching profession. The analysis occurred over three stages; the first was to acquire the statistics about the magnitude of teacher turnover and its role in school staffing problems. The second utilized multiple regression analysis to examine the effects of school characteristics, organizational conditions, and teacher characteristics on teacher turnover.

The third involved a more in-depth look at the reason teachers gave for leave the teaching profession.

With respect to the first stage, the researcher concluded that dissatisfaction was found to be a primary reason why teachers left the profession. The percentage of teachers that left due to retirement was fairly low and turnover prior to retirement was high for teachers, as compared to most other professions.

The second stage of the study focused on teacher characteristics including age, content area (math, science, or special education), gender, and race. School characteristics included were public or private, student enrollment size, suburban or rural, and secondary level. Organizational conditions consisted of advanced salary, administrative support, and faculty influence.

Finally, the third stage examined data drawn from an additional set of items in the TFS questionnaire that asked teacher-respondents to indicate why they left the teaching profession. This study determined that a significant factor for teachers that chose to leave the teaching profession was due to dissatisfaction. The causes for this dissatisfaction, reported by the teachers, included: lack of administrative support, poor salary, lack of faculty influence over classroom and school policies and practices, and student discipline problems (Ingersoll, 2001).

In summary, Ingersoll's study determined that a primary factor for teachers who chose to leave the teaching profession was dissatisfaction reported to be caused by: lack of administrative support, poor salary, a lack of faculty influence over school and classroom policies and practices, and student discipline problems (Ingersoll, 2001).

This same root cause of dissatisfaction among teachers, dissatisfaction among teachers, dissatisfaction stemming from working conditions within schools, was also seen in research conducted by Ingersoll and Smith (2003). Ingersoll and Smith stated that when compared to most other professions, the teaching occupation suffers from chronic and relatively high turnover. The researchers used data from the nationally representative SASS and TFS to provide an estimate of the cumulative attrition (those who leave teaching all together) of new teachers in their first years of teaching.

Descriptive statistics employed by the researcher finds about 42% of teachers that left cited personal reasons for leaving teaching and about 29% of those surveyed said that dissatisfaction with teaching as a career or with their specific job was a main reason for leaving the profession. The researchers analyzed the reasons associated with new teacher dissatisfaction using data from the National Center for Education Statistics (1994-1995 Teacher Follow up Survey). Top reasons cited for dissatisfaction among new teachers were: poor salary (78.5%), discipline problems (34.9%), poor administrative support (26.1%), poor student motivation (17.0%), and lack of faculty influence over classroom and school policies and practices (6.0 %). The two other two factors, discipline problems and poor student motivation, may be linked to inexperience and add to stress which may also lead to dissatisfaction. The model for this study's research includes the constructs of salary satisfaction, administrative support, influence over classroom and school policies and practices, and perceived stress, which indirectly includes student discipline and motivation.

Sass et. al. (2011) sought to identify teacher and school characteristics that influence teacher attrition. The researchers used a data base from public school teachers

in Texas over a twenty two year span for analyses. Only teachers that entered and left the profession between 1988 and 2010 were considered for this study resulting in a sample of 215,482 teachers for study 1. In study 1, univariate analyses was performed to determine the impact of teacher variables on teacher attrition. The teacher variables included: beginning teacher age, gender, race/ethnicity, teaching assignment, and testing era.

Using the Kaplan-Meier test to compare survival functions, the test revealed a beginning teacher's age was statistically significant with younger teachers possessing higher attrition rates. The researchers also used the Kaplan-Meier test to explore the relationship of genders on retention and found a statistically significant difference; females were staying in the profession longer than males on average. Using the Cox proportional hazard regression, Sass et. al. (2011) found differences between race and ethnic groups. The results suggested that African Americans and those labeled as "Other" possessed larger hazard functions. However, many groups had significantly smaller sample sizes than Whites, African-Americans, and Hispanics and thus they were grouped together as "Other." The researchers also evaluated teaching assignment based on high-need areas vs. non-high-need areas. The high-need areas were middle and high school mathematics and science teachers, ESL, and foreign language. The Kaplan-Meier test indicated a statistically significant effect of teacher classification. These analyses determined that foreign language teachers were the most likely group to choose to leave teaching, followed by middle and high school mathematics teachers, then middle and high school science teachers. There was no statistical difference between ESL teachers and non-high needs teachers found in this study.

The second analysis by these researchers examined school characteristics connected to teacher retention from 1995 – 2009 for 128,127 Texas teachers (Sass et. al., 2011). The Kaplan-Meier test revealed that the survival functions were different across Annual Yearly Progress (AYP) status. AYP is a measure of school performance and the results indicated teachers from lower performing schools were more prone to higher attrition rates as compared to teachers at exemplary schools. Survival curve analysis also revealed that elementary teachers were less likely to leave teaching when compared to middle and high school teachers. High school teachers were found to be a slightly higher risk of leaving the profession as compared to middle school teachers.

The researchers also concluded that teacher attrition is higher during high-stakes testing, especially for lower performing schools. According to the researchers, the results suggest that higher standards had a significant negative impact on teacher retention. The risk of leaving the teaching profession during the TAKS (Texas Assessment of Knowledge Skills) testing was 24% higher than during the TEAMS (Texas Educational Assessment of Minimum Skills) in the late 1980's era. The TAKS testing imposed higher standards and consequences for students and teachers beginning in 1999. The researchers suggest one theory concerning secondary teacher turnover; highly qualified high school math and science teachers could likely find higher pay for curriculum development, central office jobs, or obtaining outside employment which contributes to higher attrition in those high-need areas. The researchers' findings from this study correlate to other studies about factors that influence a teacher's intent to remain in teaching. If more teachers are leaving due to high-stakes testing and working in lower performing schools, then these factors may contribute to the feeling of a lack of influence

over classroom and school policies and practices. These factors add stress, thereby leading to occupational dissatisfaction and may result in subsequent voluntary teacher turnover. Furthermore, the researchers' assertions concerning qualified math and science teachers having the ability to leave for higher paying jobs makes plausible the researchers' belief that some of these teachers experience some level of salary dissatisfaction.

Another study in Texas looked deeper into the impact of teacher salary and turnover (Garcia C.M., Slate J.R., and Delgado C.T., 2009). The purpose of the study was to analyze school and teacher characteristics associated with teacher turnover in order to better understand the factors that impact teacher turnover rates. The research question explored the relationship between teacher turnover rate and average teacher salary in Texas. This study reviewed three years of data from the Academic Excellence Indicator System regarding teacher salary and attrition. The study analyzed data from all public school districts in the state of Texas for three school years (2003-04, 2004-05, and 2005-06). The researchers found a statistically significant relationship between teacher turnover rate and average teacher salary for all school districts in the State of Texas using a Pearson product-moment correlation coefficient for each of the three years. According to the study, districts with higher average teacher salaries had lower rates of teacher turnover. Average teacher salary explained approximately 20 percent of the teacher turnover rate. The researchers conducted an analysis of variance (ANOVA) to determine whether teacher turnover rate differed among the school districts with the highest average salary and school districts with the lowest average salary. The average teacher turnover rate was more than twice as high in the poorest paying school districts as compared to the

best-paying school districts. The findings from this study based on the three years of data for all school districts in the State of Texas concluded that average teacher salary was significantly associated with teacher turnover.

A study by Fisher (2011) examined stress, burnout, job satisfaction, and preventive coping skills among teachers. The potential participants were 412 secondary-level teachers who attended an Advanced Placement professional development workshop in the summer of 2008 on the campus of a large university in the United States. 385 teachers completed the survey for a response rate of 93.4 %. The goal of the study was to determine if there was a significant difference between the stress and burnout of those teachers in the first five years as compared to those with more than five years of teaching experience. A second purpose of the study was to determine if those teachers who claim to be dissatisfied were more stressed than those teachers who claimed to be satisfied with the profession. The third goal was to identify a combination of variables that can be significant predictors of a teacher's stress and burnout level.

All participants were asked how satisfied they were with the teaching profession from 0 (very satisfied) to 3 (very dissatisfied). Seven participants chose not to answer the question so job satisfaction was not used as a variable to stratify the conduct group comparisons. The satisfaction question was only used as an outcome variable in an effort to determine whether other factors can contribute to a teacher's job satisfaction.

Three individual survey instruments were combined into a single packet and used to collect data for this project. The burnout score was found from a combination of Emotional Exhaustion, Depersonalization, and Personal Accomplishment from the MBI (Maslach Burnout Inventory) which had a Cronbach's alpha of .895. The two

components of the teacher stress score showed strong reliability. The bivariate between the two components (appraisal of resources and appraisal of demands) was found to be small ($r = .104$) until they were combined to create a stress score which yielded a high reliability ($\alpha = .895$). The shortened Preventative Resources Inventory was found to be reliable ($\alpha = .846$).

A one-way ANOVA was conducted to determine if there was a significant difference between stress and burnout levels of teachers with five or less years of experience (novice) and teachers with more than five years of experience. The ANOVA showed that the teachers in the two groups did not have a statistically significant difference in stress. The data suggest that teaching is a stressful career at all levels of experience. However, results did indicate that novice teachers reported a higher level of burnout. This is of particular interest because burnout is often associated with prolonged exposure to stressful conditions.

A multiple regression analysis was conducted with the dependent variable of job satisfaction, which was measured by a single question, and the independent variables of burnout and stress. The independent variables were moderately correlated ($r=.502$). The regression analysis was found to be statistically significant ($r^2=.337$, $F=96.77$, $p<.001$). Levels of stress ($\beta=.129$, $p=.008$) and burnout ($\beta=.508$, $p<.001$) were found to be statistically significant predictors of job satisfaction.

The results of this study revealed that 34% of the variance in job satisfaction of participating teachers could be attributed to stress and burnout. Dissatisfaction can lead to departures (Ingersoll, 2001; Ingersoll & Smith, 2003), so a remedy to reduce stress and burnout should result in an improvement of schools and, thus, better educated students.

Two more multiple regression analyses were used to determine which factors contribute to teacher stress and burnout. Stress was used as the dependent variable, and the following were independent variables: number of students taught, years of experience, age, gender, self-acceptance, job satisfaction, and burnout. With burnout as the dependent variable, the independent variables were: number of students taught, years of experience, age, gender, self-acceptance, job satisfaction, and stress.

The Pearson correlation coefficients indicated statistically significant bivariate correlations between some of the independent variables. Job satisfaction correlated significantly with all variables except gender. From the Pearson correlation coefficients, it was determined that years of experience, age, job satisfaction, self-acceptance, and burnout were all significantly correlated to stress. The results indicated that years of experience, job satisfaction, and burnout were statistically significant predictors of stress. The second multiple regression test indicated job satisfaction, self-acceptance, and stress are all significant predictors of burnout.

A limitation of Fisher's (2011) study was the use of only teachers of Advanced Placement (AP) courses. However, the researcher maintained that because the majority of these teachers do not teach *only* AP classes, the results may be generalizable. Another potential factor indicated by the researcher is that AP teachers are under more scrutiny for accountability due to the nature of the national test as compared to other subject area tests that are only state mandated; this difference may also limit the generalizability of this study.

According to the researcher, the data show the need to reduce stress for teachers, which if accomplished would lead to more satisfied educators. Higher job satisfaction

has also been positively correlated to teacher retention in education (Ingersoll, 2001; Ingersoll, R.M. & Smith, T.M. 2003). If stress among teachers is inversely related to the job satisfaction, and job satisfaction is directly related to job retention among teachers, then it can be inferred that self-reported stress by teachers should be inversely related to teacher retention or intent to stay in the profession.

Sedivy-Benton and McGill (2012) investigated factors that impact a teacher's intent to stay or leave the profession. The study used quantitative data collected by the SASS from the 2007-2008 school year by the National Center for Education Statistics. The researchers examined the factors in teacher work environments that influenced their intention to remain in or leave the profession. The dependent variable was continuous ranging from "as long as I am able to" to "definitely plan to leave as soon as I can." The study used multiple regression to analyze the extent to which the independent variables of teacher and school characteristics impacted the dependent variable, teachers' intent to remain in the teaching profession. The researchers concluded that although administrators cannot address all factors that impact teachers, (ie. student poverty, gender, etc.) they should address those factors that can be influenced or controlled. The researchers found that salary was a significant predictor of whether or not a teacher had intentions of remaining in the profession, as were perceived support from the administration, and the extent to which a teacher had influence over classroom and school policies and practices. The study's findings were consistent with Ingersoll (2001) and Ingersoll & Smith (2003) with regard to factors that were found to have a significant influence on a teacher's intent to stay in the teaching profession.

Curtis (2012) examined reasons why math teachers entered the teaching profession compared to reasons why math teachers left the profession. A random sample of 5000 middle and high school mathematics teachers in the United States received surveys. The surveys were distributed by mail in October 2010 and included demographic questions which included age, gender, and ethnicity. The survey participants were also asked to place a check mark beside as many of the reasons for becoming a teacher as they deemed appropriate from a list of 12 responses. Participants were also asked how long they intended to stay in the teaching profession and reasons why they would leave. Teachers were also asked to rate their level of satisfaction with being a teacher. The surveys were completed by 1571 participants for a response rate of 31.4 %. Over 800 survey respondents indicated that they would agree to an interview. The surveys were then sorted into two categories: those who had no intensions of leaving the teaching profession anytime soon and those that planned on leaving in the next five years (not due to retirement). From those math teachers that reported that they intended to leave the teaching profession, a random sample of 32 participants were selected and interviewed to gain further insight into why they had intentions to leave the teaching profession. When teachers were asked to rate their level of satisfaction with being a teacher, the results showed a significant relationship in their responses ($F = 135.379$, $df = 1$, $p < .001$) with their decision to leave teaching. A Chi Square test was conducted to determine the strength of the relationship between the independent variables of the reasons to become a teacher with the dependent variable of leaving or staying in the teaching profession. Results showed that the reason "like working with young people" was significantly related to leave/stay ($R^2 = 5.723$, $df = 1$, $p = .017$). The response,

"parent/family encouragement," was also significantly related to leave/stay ($R^2 = 6.652$, df = 1, p = .010).

A one-way ANOVA was conducted using the independent variable, satisfaction with being a teacher, with the dependent variable of leaving or staying in the teaching profession. When teachers rated their job satisfaction low with teaching, teachers were significantly less likely to state that they planned to stay in teaching. Conversely, there existed a positive statistically significant relationship between job satisfaction and intent to stay in the teaching profession.

Participants were asked about how long they anticipated staying in the teaching profession and the reasons why they would leave. Reponses were grouped into the nine most common areas with the tenth area being "other." The most common response was lack of administrative support. This was followed by lack of parental support, lack of suitable compensation, and other career opportunities. When teachers were asked to rate their level of job satisfaction with being a teacher, the results indicated a significant relationship between job satisfaction and intention to leave teaching ($p < .001$).

In question 2, "What factors would lead to your decision to leave teaching," the primary reasons for leaving the profession included teacher blame, low salary, and lack of administrative support. According to this study, one-third of the respondents replied that they were planning on leaving in the next five years.

The direct correlation between job satisfaction and intent to stay in the teaching profession found by Curtis (2012) is consistent with the findings from Ingersoll & Smith (2003). Constructs identified in the study by Curtis (2012), job satisfaction, salary satisfaction, and administrative support, were identified as significant predictors to a

teacher's intent to stay in the teaching profession, as within other studies as well (Garcia, Slate, Delgado, 2009; Ingersoll, 2001; Ingersoll & Smith, 2003; Sedivy-Benton & Bolden McGill, 2012).

Researchers Kersaint et. al. (2007), investigated continuing teachers' plan to remain in teaching or resign, and the likelihood of resigned teachers to return to teaching in the next three years. More specifically, the researchers explored the factors that would encourage or hinder resigned teachers' decision to return and to what extent those factors impacted their decisions. The researcher also studied the factors that impacted current teachers' decisions to stay or leave the profession. The participants were from two large school districts in Florida who had left the district in 2002-2003 and 2003-2004. The instrument used in this study began with 36 survey questions designed to elicit information about the factors that contributed to teacher attrition. The same questions were then asked of a stratified randomized sample of continuing teachers. The continuing teachers were matched by major demographic characteristics such as gender, race, experience, school district, school level, locale, and school SES. The study used a mixed-method approach, employing both surveys and interviews. The first pre-survey used open-ended questions to 51 teachers from the study population. The pre-survey investigated the behavior "return to teaching in the next three years." Participants were asked about the advantages and disadvantages to teaching within the next three years. Participants were also asked about factors that would make it easier or more difficult to return to teaching the next three years; these questions were asked to measure perceived behavioral control. Responses were transcribed and coded using an open coding scheme. For attitude toward the behavior concerning perceived advantages and disadvantages,

three positive beliefs were identified: joy of teaching, financial benefits, and helping children grow and learn. Negative attitudes toward behavior identified included: less time with family, less time with children, and the inability to care for other family members.

For subjective norm toward the behavior, the questions asked for the identification of any individuals or groups who might approve or disapprove of a return to teaching in the next three years. Subjective norm, in this study, refers to the belief about whether most people approve or disapprove of the behavior. Three beliefs were identified: colleagues, administrators, and family as people whose opinions would play a role in deciding to return to teaching. For behavioral control, participants were asked about factors that would make it easier or more difficult to return to teaching. Four positive beliefs emerged which included: support from school administrators, opportunity to teach part-time, benefits such as health and retirement, and support from district administrators. Five negative beliefs emerged: emphasis on assessment, paperwork, non-teaching responsibilities, financial responsibilities, family responsibilities, and stress.

A final survey was constructed based on the responses from the initial survey which resulted in a two statements for each of the 18 identified beliefs. One statement was designed to capture the belief itself and the other was to capture the level of importance of the belief. The resulting 36-item survey were randomized and respondents were asked to rate them on a Likert-scale with 1 representing strongly disagree and 7 being strongly agree.

Of the total 2,858 teachers who left teaching in 2002-2003 and 2004-2004, 1,131 were reached (39.6%) and 901 teachers completed the survey during a telephone

interview for a response rate of 31.5% of the total teachers that left during that time. A stratified random sample of 1,145 current teachers who matched the demographic characteristics of those who resigned were selected to participate. A total of 898 teachers that continued to teach in 2004-2005 completed the survey for a response rate of 78.4%.

The study included the following demographics as controls: gender, race, and years of experience. A multivariate analysis of variance (MANOVA) with follow-up Tukey comparisons was done to determine whether or not there were significant differences in factor scores between leaves and stayers within demographic groups. Factor scores ranged from 3.04 to 6.44 (possible 1 – 7) with a low score reflecting that the factor was of high importance in shaping the teacher's decision not to return to teaching. Considering the overall goal of teacher retention, factors with low scores would indicate issues that merit attention. Factors scores from demographic groups for the overall sample by leavers and stayers revealed some important key points. Time with family was of high importance to leavers and low importance to stayers which indicates that teachers may leave the profession to spend more time with family. Administrative support was of medium importance to leavers and low importance to stayers. According to the researchers this indicated that a lack of administrative support played a role in teachers deciding to leave the teaching profession. Financial benefits were of medium importance to leavers and of low importance to stayers which indicated that a lack of financial benefits also plays a role in teachers leaving the profession. Family responsibility was of high importance to both leavers and stayers. Paperwork and assessments are of medium importance across all demographic groups for leavers and stayers. According to the researchers, the most influential factor related to teacher

retention was personal and family reasons. This was followed closely by administrative support, financial benefits, and paperwork/assessments. Leavers, according to the researchers, may have found better paying jobs or jobs with similar pay but with less stress as suggested by the qualitative component of the study. Paper work and assessments were also found to be significant to both stayers and leavers because of their link to stress. The influential components of administrative support, salary satisfaction, influence over classroom and school policies and practices, and stress, and how they impact job satisfaction seem to all be issues that impact teacher intentions to remain or leave teaching. This study supports the importance of understanding how factors such as administrative support, financial benefits, influence over classroom and school policies and practices, and stress impact job satisfaction and how all of these variables influence teachers' intent to stay in the teaching profession.

Research by Gonzalez, Brown, and Slate (2008) investigated school teacher attrition in Texas. More specifically, these researchers examined the reasons for leaving given by teachers who left after only one year of teaching. Former teacher interview narratives and detailed field notes were used as the chosen instruments for this qualitative study. All participants were located through snowball sampling but all were selected based on criterion sampling. The criterion sampling included certified teachers who entered teaching and left after only one year and included eight participants. Interviews with each of the eight participants ranged from 45 minutes to two hours. Seven out of eight of the participants cited the administration as one of the biggest influential factors for leaving the profession. The teachers interviewed commented on the disrespect from administration as well as a lack of support from the administration. With regard to

salary, seven out of eight of the participants cited low pay in comparison to the amount of work and stress as a factor for leaving the profession. Student discipline problems, influence over classroom and school policies and practices, and extra duties were also mentioned several times by the participants. Limitations to this study include the sample size of only eight teachers who left the profession after one year in the classroom; due to the small sample size, this study would have limited generalizability to other areas.

Curtis and Wise (2012) conducted a study to examine the reasons teachers went into the teaching profession and compared those results with the reasons why they left the teaching profession. Thirty-two math teachers were selected and interviewed from over 800 math teachers across 19 States who expressed an intent to leave the teaching profession in the next five years, according to the survey. The study is important for identifying key factors that attract, support, and retain qualified mathematics teachers to maintain quality mathematics education. The researchers concluded that the math teacher participants went into teaching for reasons such as a desire to work with young people, love of math, and wanting to make a difference, but the reasons for leaving centered on low salary, teacher blame, and lack of administrative support.

In a qualitative study by Goodpaster, Adedokun, and Weaver (2012), the researchers employed phenomenography to study the experiences of rural STEM teachers. This approach was selected because the researchers wanted to better understand job attrition and retention among teachers by examining the shared or collective experiences of the participants. The researchers used open-coding to identify statements or comments as they related to attrition or retention. Three categories were determined for these responses; interpersonal relationships/community ties, school factors, and

professional factors. The researchers indicated both positive and negative aspects within each group. In the category of school factors, identified positive and negative aspects included: the teacher-administrator relationship, relationship with students, safe environment, and salary/benefits. One limitation important to note is that the sample included six participants, all of whom were recruited from the same summer program. One of the implications of this study is that the attrition of STEM teachers, particularly in rural areas, could be linked to numerous responsibilities such as teaching multiple subjects and/or, multiple levels, insufficient mentoring, lack of administrative support, and insufficient pay. According to the researchers, the same constructs in the research model can be used to explore both the reasons why teachers stay in teaching, as well as the reasons why they want to leave. Many of the reasons are the same but, of course, inversely related. For example, teachers that reported a positive relationship with the administration and greater satisfaction with salary were more likely to remain in teaching, whereas teachers who had a negative relationship with the administration and were less satisfied with their salary were more likely to report intentions of leaving the profession.

Lopez (2010) investigated reasons why teachers quit the profession by analyzing the minutes from school meetings to identify trends. The study focused on whether problems that existed in a particular school were consistent with the professional literature cited concerning teacher dissatisfaction that leads to teacher turnover. If those problems arose, the study would examine how often they arose and how they were addressed? The study was conducted by reviewing and coding the minutes of meetings from a specific school. The researcher not only collected information from the meetings of meetings but also conducted interviews with individuals. The researcher concluded

that the top reasons for teacher dissatisfaction as coded in the minutes were (1) student discipline problems, (2) lack of support from the administration, and (3) poor salary, followed by (4) large class sizes, (5) inadequate preparation time, and (6) lack of influence over school decisions. An important limitation of this study is that this information was gathered from a single school and also that the researcher worked in that school.

Of the twelve studies included in this literature review, nine indicated that administrative support significantly influenced a teacher's decision to leave the profession. Eleven of the twelve studies cited salary or salary satisfaction as having a significant impact on a teacher's intent to leave teaching. Four of the studies specifically mention a lack influence over classroom and school policies and practices as having an impact on the decision to leave the classroom. Stress was also mentioned in several of the studies and the construct may be associated with other constructs measured in these studies such as, teacher blame, student discipline, and paperwork.

Consistencies among these studies suggest that there exist relationships among the independent variables of administrative support, influence over classroom or school, salary satisfaction, and stress with the dependent variables of job satisfaction and a teacher's intent to stay in the teaching profession. Also, previous research has demonstrated a direct correlation between job satisfactions and a teacher's intent to leave the profession. These research studies provide the foundation of and support for the conceptual model for the proposed study, and Table 2.1 summarizes these studies.

Table 2.1

Why Teachers Leave the Teaching Profession

Study	Setting / Data	Key Findings	Analysis	Dependent Variables
Teacher Turnover and Teacher Shortages: An Organizational Analysis (Ingersoll, 2001)	Data came from the 1991-1992 cycle of the SASS and the TFS. The study included 6,733 participants nationwide.	Four common reasons for teacher attrition due to dissatisfaction: lack of administrative support, poor salary, lack of faculty influence, and student discipline problems.	Quantitative – Multilevel Regression Analysis	(a) Magnitude of teacher turnover, (b) effects of the school and teacher characteristics on turnover, and (c) reasons reported by teachers for turnover.
The Wrong Solution to the Teacher Shortage (Ingersoll & Smith, 2003)	Descriptive statistics from NCES (National Center for Education Statistics) using SASS and the TFS (1994-95).	Top reasons for teacher attrition among beginning teachers was family/personal reasons. Other factors included: poor salary, discipline, poor administrative support, student motivation, and lack of faculty influence.	Quantitative Descriptive	Reasons beginning teachers leave the profession and reasons beginning teachers who left were dissatisfied. Also the number of new teachers who participated in an induction and/or mentoring program.
Identifying Personal and Contextual Factors that Contribute to Attrition Rates for Texas Public School Teachers (Sass, Flores, Claeys & Perez, 2012)	Texas teacher data collected (1988 – 2010). The data consisted of 215,482 teachers in stage 1 (1988 – 1994) and 128,127 teachers in stage 2 (1995 – 2009).	The research indicated a higher level of attrition during times of high-stakes testing and in lower performing schools, but cites many moderating variables.	Quantitative – Univariate and multivariate analysis	Teacher and school variables associated with attrition. Teacher characteristics: age, gender, subject, race/ethnicity. School variables included: testing, school type accountability, school level.
Salary and Ranking and Teacher Turnover: A Statewide Study (Garcia, Slate, Delgado, 2009)	Researchers examined data from the Academic Excellence Indicator System from all public school districts in the State of Texas, 2003-06.	Researchers found a clear link in teacher salary and teacher turnover. Where the average salary was higher, there was a tendency for teacher turnover to decrease. Lack of competitive salaries along with poor working conditions are the primary reason for high teacher turnover.	Quantitative – Correlational and ANOVA analysis	This study analyzed school district and teacher characteristics associated with teacher turnover. Researchers examined the relationship between turnover and average salary and the difference between the highest and lowest paying school districts.

Factors Influencing Stress, Burnout, and Retention of Secondary Teachers (Fisher, 2011)	Nearly 400 teachers completed a 30 minute survey to examine stress, burnout, satisfaction, and coping skills. The teachers attended a workshop at a large, urban university in the Southeastern United States.	New teachers reported higher levels of stress as predicted by job satisfaction, years of experience, and burnout. Stress and burnout were significant predictors of jobs satisfaction. Primary factors include more pressure added by administration. Reducing stress will lead to higher job satisfaction.	Quantitative – Multiple Regression	Dependent variables included stress, burnout, satisfaction, and preventative coping skills. Stress was measured using two scales including classroom demands and classroom resources. One question measured satisfaction with teaching (1 to 4).
Significant Factors for Teachers' Intensions to Stay or Leave the Profession: Teacher Influence on School. Perception of Control and Perceived Support (Sedivy-Benton & Boden McGill, 2012)	Data collected by the SASS from 2007-08. Independent variables were influence of teacher and school characteristics and salary, on the dependent variable, the teacher's intent to remain in the profession.	Researchers found that salary was an indicator for intent to stay. Other factors included perceived support from the administration and control over their classroom.	Quantitative – Linear Test of Least Squares	The dependent variable was a continuous variable ranging from "as long as I am able to" to "definitely plan to leave as soon as I can". The total data set for this nationwide survey was 20,324 participants.
Why do They Choose to Teach – And Why do They Leave? A Study of Middle School and High School Mathematics Teachers (Curtis, 2012)	1571 surveys by math teachers Nationwide. Follow-up interviews were conducted to gain further insight into why they had intensions of leaving the profession.	One-third of teachers replied that they were planning on leaving teaching in the next five years. There existed a direct and strong correlation between positive job satisfaction and intent to stay in teaching. Primary reasons for leaving the profession included teacher blame, low salary, and lack of administrative support.	Quantitative – Bivariate (Chi Square and ANOVA)	This study examined reasons math teachers went into teaching and reasons for teachers leaving the profession. An ANOVA was conducted using the independent variables of job satisfaction and the dependent variable, leaving or staying.
Why Teachers Leave: Factors that Influence Retention and Resignation (Kersaint, Lewis, Potter, Meisels, 2006)	Teacher that left two Florida districts during a 2-year period. 901 teachers completed the survey by phone and 898 current teachers also completed the survey.	The most influential factors regarding teacher resignation reported included: personal and family reasons, followed by lack of administrative support, salary, and paperwork and assessments.	Mixed Method – Quantitative (MANOVA w/ Tukey) and Qualitative	The researcher examined continuing teachers' plans to remain in teaching or the likelihood that resigned teachers would return to teaching in the next 3 years.

Teachers Who Left the Teaching Profession: A Qualitative Understanding (Gonzalez, Brown & Slate, 2008)	The qualitative study included interviews with eight teachers that left the profession in Texas. The interviews were coded and results were shared.	All eight cited the lack of administrative support. Seven cited low salary. Other factors included student discipline, lack of influence over classroom and school policies and practices, and extra duties.	Qualitative	Reasons teachers gave for leaving the profession after only working one year as a teacher. Eight people were contacted and interviewed concerning their reasons for leaving.
Mathematics Teachers Speak Out- Why Are We Losing Our New Teachers? (Curtis & Wise, 2012)	32 teachers were randomly selected from 800 teachers across 19 states that expressed the intent to leave their teaching jobs in the next five years.	Common reasons for leaving the teaching profession were low salary, teacher blame, and lack of administrative support.	Qualitative	The 32 teachers were interviewed to find out reasons why they had intentions of leaving the profession. The self-reported reasons were then coded and compiled.
Teachers' Perceptions of Rural STEM Teaching: Implications for Rural Teacher Retention (Goodpaster, Adedokun & Weaver, 2012)	All six participants were recruited from the same developmental summer program and interviewed.	One of the implications was that STEM teacher attrition could be linked to multiple responsibilities, insufficient mentoring, lack of administrative support, and insufficient pay.	Qualitative	Phenomenography was used to describe, analyze, and understand data regarding the lived experiences of rural STEM teachers. Researchers found comments related to rural teacher attrition and retention.
Reducing Teacher Turnover by Utilizing a National List of Reasons for Teacher Dissatisfaction or How to Keep Teachers from Declaring "Dear Folks, I Quit" (Lopez, 2010)	The researcher analyzed and coded the minutes from meetings from a particular school. The researcher also conducted interviews to determine top reasons for teacher dissatisfaction.	Primary reasons for dissatisfaction included student discipline problems, lack of administrative support, poor salary, large class size, inadequate prep time, and lack of influence over school decisions.	Qualitative	The purpose of this study was to identify problems in a school that lead to teacher dissatisfaction and then lead to teacher turnover.

Why Teachers Stay

Research regarding teachers who leave, or are considering leaving, the teaching profession provides insight into the teacher turnover in education. Equally important to studying teacher turnover is examining the reasons why teachers remain in the teaching profession; these are opposing sides to the same issue. The following section examines the research regarding reasons that influence a teacher's decision to remain in the classroom. Identifying the significant factors that influence a teacher's intent to leave the profession or remain in the profession can provide meaningful information to administrators and policy makers in determining how to prioritize their resources for retaining qualified math and science teachers. Many of the factors that influence a teacher's decision to stay in teaching or to leave the profession are the same, but inverse (Goodpaster, Adedokun, and Weaver, 2012). The following studies are first presented by type of analysis, beginning with quantitative research regarding factors that influence a teacher's intent to stay in the profession. The studies also begin with national data and move to more location specific studies. The final studies are qualitative, adding more in depth information about factors that influence teacher retention through interviews. Table 2 summarizes the studies found in this section of the Literature Review.

Gardner (2010) analyzed factors that influenced the retention, turnover, and attrition of K-12 music teachers in the United States. Both turnover and attrition occur when a teacher leaves the classroom. When turnover occurs, the school division seeks to replace the teacher. The researcher in this study identifies attrition as when a school division leaves the vacancy unfilled or eliminates that job or role. Data sources for the study was the 1999-2000 School and Staffing Survey (SASS) and the 2000-2001 Teacher

Follow-up Survey (TFS). The researcher analyzed the data by first determining the frequencies and descriptive statistics for each of the variables. Gardner used bivariate analysis for equality of means and Pearson chi-square tests for homogeneity. The researcher also employed multivariate procedures including factor analysis, logistic regression, and structural equation modeling.

The research questions sought to determine the personal and professional attributes of K-12 music teachers in the United States and the characteristics of the school in which they teach. The second research question asked what opinions and perceptions K-12 music teachers in the United States held about their jobs and work places. The third research question asked how teacher attributes, job attributes, school attributes and teacher opinions and perceptions of the work place related to job satisfaction. Finally, the last research question focused on how teacher attributes, job attributes, school attributes, teacher opinions and perceptions of the work-place, and job satisfaction related to the retention, turnover, and attrition.

The study included data from 128,479 K-12 music teachers across the United States. Results identified five independent variables were significantly related to job satisfaction: base salary, sex, race/ethnicity, administrative support, and extent of students' welfare and parental support. Teacher opinions and perceptions of the workplace had significant effects on their job satisfaction and their intention to stay in or leave the teaching profession. Teacher perceived support from the administration, parents, and the more perceived control over their classroom, significantly impacted the teachers' intent to stay in their position rather than leave for another teaching job or leave the profession all together. Music teacher perception of the level of support received

from administrators was the strongest predictor of teacher opinions and perceptions of the workplace. The data also showed that teacher opinions and perceptions of the workplace had a significant impact on job satisfaction. According to the researcher, retention, turnover, and attrition rates of music teaches are comparable to those of other types of teachers.

A study by Hughes (2012) examined the influence of teacher and school characteristics, organizational characteristics, and teacher efficacy, on teacher retention. The chosen mixed method approach used a 60-item survey with Likert-style questions and two open-ended questions; "What are some factors that make you consider leaving teaching?' and "What are some factors that keep you from leaving teaching (why do you stay in teaching)?" Based upon a stratified sample of teachers from 200 schools in a southern state with 789 respondents the researcher found that of the 14 predictors, years of experience, socio-economic status, salary, workload, parent and student, and technology all made statistically significant contributions to the model. Data were entered into SPSS for analyses and the researcher employed block-entry logistic regression analyses to explore the potential relationships between teacher retention and teacher characteristics, school characteristics, organizational characteristics, and teacher efficacy. The researcher recommended reducing workloads and improving cooperation among faculty due to its impact on the stress of a teacher. The study also determined salary to be a statistically significant and positively correlated factor among teachers who remained in the teaching profession. According to the researcher, schools interested in improving teacher retention should consider increasing salaries, reducing workloads, and improve parent/student cooperation.

The purpose of a study by Kaufman and Adel Al-Bataineh (2011) was to examine the factors that influence the retention of teachers in their first give years of teaching in a public school district in Central Illinois. The participants included in the study came from seventeen elementary schools, three junior high schools, and two high schools. The data collection consisted of a self-made survey that included a demographic section as well as seventeen Likert scale times with possible responses ranging from 1 (strongly agree) to 7 (strongly disagree). The seventeen questions asked for information about factors that influence teacher retention. The final question was an open-ended question that allowed participants to share any additional information.

Ninety-seven certified teachers agreed to participate in the study and completed the online survey about attitudes and opinions on factors that influence teacher retention. The researcher used descriptive statistics to identify the factors that had the greatest influence on teacher retention. Results showed most participants agreed that school district provided them with sufficient support (73%) and that their building administrator was supportive and encouraging (74%). Most of the teachers surveyed agreed to some degree that they plan to remain in the teaching profession (83%). The data shows that many of the participants (40%) disagreed to some degree that they were satisfied with their class sizes and that they were satisfied with their teaching salary (36%).

The majority of the teachers that participated in this research agreed that they did receive adequate support from peers and administrators during the first years in the teaching profession. In conclusion, most of the teachers that participated in this study reported support from the building administrator was a key factor in influencing teachers to remain in the profession. Over one-third of respondents were not satisfied with their

teaching salary which appears to continue to be an issue that influence many to leave the teaching profession. An important limitation of this study is that all participants were teachers from one school district.

Boyd et. al. (2012) explored the relationship between school and contextual factors and teacher retention in New York City. The intent of the study was to better understand the relationship between teacher turnover and school contextual factors – including teachers' influence over school policy, school administration effectiveness, staff relationships, student behavior, and facilities and safety. The survey was distributed in the spring of 2005 to all first-year teachers in New York City and completed by 4,360 participants. Follow up surveys in the spring of 2006 were distributed to teachers that stayed as well as to teachers that left. More than half of the questions came directly from the SASS. The researchers used multinomial logistic regression to estimate the influence of teacher and school characteristics on teacher retention. In the full model which included all six school contextual factors and the controls, the school administration factor is the only one that significantly predicts teacher retention decisions after controlling for other school and teacher characteristics. When each school contextual factor is included separately, the administration, staff relationships, students, and facilities significantly predict decision to transfer or leave teaching in New York City.

Researchers Greenlee and Brown (2009) surveyed teachers to identify principal leadership behaviors and incentives that were most effective in creating an educational environment where teachers wanted to stay. The convenience sample included 97 teachers from an educational leadership program at the University of South Florida to participate in an online survey. The majority of the respondents (57%) indicated salary

enhancements were important, followed by control in the classroom, such as more autonomy and resources to create a strong curriculum (22%). In terms of principal behaviors, teachers responded that they wanted leadership that created a positive school culture and worked with teachers. The findings from this study revealed that financial incentives, working conditions, and principal behaviors all played an important role in the recruitment and retention of teachers in challenging schools. The researcher finds the principal to be a key influence to working conditions by improving school culture. Teachers should have small class sizes, access to high-quality professional development, adequate resources, and adequate planning time. As with several other studies reviewed, salary, influence over classroom and school policies and practices, and administrative support continue to be influential factors with respect to the retention of teachers (Gardner 2010; Ingersoll, 2001; Ingersoll & Smith, 2003; Lopez, 2010; Sedivy-Benton & Boden McGill, 2012).

Using data from 1999-2001 SASS/TFS surveys, Tai, Liu, and Fan (2007) extracted data about secondary math and science teachers to examine the impact of teacher and school characteristics on teacher retention. Teacher characteristics included: age, educational background, salary satisfaction, and teacher experience. The sample included 916 math and science teachers who completed both surveys and excluded teachers that retired before the follow-up survey or were not full time, resulting in 745 participants used for this study. The independent variables used in this analysis came from the 1999-2001 SASS/TFS surveys. For salary satisfaction, the researchers included teachers' responses to a question asking them to rate their degree of satisfaction in salary on a 4-point Likert-type scale. Findings indicated that teachers in higher earning brackets

were 1.46 times more likely to stay in teaching as compared to teachers in the lower earning brackets. Also, teachers that reported higher salary satisfaction rating are 1.37 times more likely to stay in the same school than teachers who reported lower satisfaction. This study demonstrated a positive correlation between salary satisfaction and the retention intensions of math and science teachers.

The purpose of research conducted by Certo and Fox (2002) was to collect qualitative data regarding teacher turnover and retention from an organizational perspective. Questions were designed to explore reasons teachers gave for staying in their school division, as well as their perceptions about why some of their colleagues left the division or profession. The seven Virginia school divisions represented urban, suburban and rural communities and utilized focus group interviews of teachers that stayed in the profession and also telephone interviews of teachers who left, either for another school or left the teaching profession entirely. The methodology used focus groups composed of teachers that primarily had less than eight years of experience in their school division. The focus group interviews were semi-structured and utilized a Teacher Retention Focus Group Discussion Guide provided by the researchers. The guide included topics about personal perspectives of staying and why colleagues are moving or leaving the teaching profession.

The participants were randomly selected teachers from three teaching assignment areas to offer a broad perspective across grade levels and critical shortage subject areas. The three groups were elementary teachers, middle and secondary math and science teachers, and special education teachers. Eighty letters and consent forms were sent to individuals asking them to participate in a focus group. The forty-two (52.5%) teachers

that returned the forms participated in one of nine focus group interviews offered at Virginia Commonwealth University. The average number of participants in each focus group was four to six members. The focus groups were audiotape-recorded and were approximately 60 to 90 minutes in length. Exiting teachers form the 1999-2000 and 2000-2001 school years were randomly selected for the telephone interviews and lasted approximately twenty minutes. The audiotaped interviews were transcribed by a professional and analyzed by the researcher.

Findings by the researchers determined that teacher turnover and retention variables are highly interrelated. In other words, a teacher may leave because of a lack of administrative support while other stay because of good administrative support. Reasons provided by individuals who participated in the focus groups for staying in their division included a commitment to teaching and a supportive administration. Perceptions regarding reasons colleagues left included salary, other employment opportunities, and a lack of administrative support. A consistent theme among reasons why teachers voluntarily leave or stay in the profession is salary, level of administrative support, job responsibilities, and job satisfaction related to their teaching environment.

The purpose of research by Brown and Wynn (2009) was to better understand the leadership styles employed by principals who lead schools that have high teacher retention rates. Semi-structured interviews with twelve principals were conducted to identify common characteristics used by principals to retain teachers. The interview questions were exploratory and asked about background information, leadership style/characteristics, school climate and culture, and the role of the principal. The setting of the study was in a small urban school district with 45 schools in a southeastern state

that serves 32,000 students. The district was chosen because of its high turnover among new teachers, 42% in their first three years (2000-2004).

The data were analyzed through comparative analysis and coding. To aid in ensuring the internal validity of the results, triangulation of interview data, verbatim quotes, and member checks were used. Several themes emerged concerning common leadership traits and strategies of principals with high retention rates. The study revealed that principals that had greater support for new teachers and shared information and allowed them to have input resulted in greater teacher satisfaction, morale, and commitment which greatly impacted teacher retention. This study's findings, according to the researchers, was that a supportive administration and teacher influence over classroom and school policies and practices had a positive impact on teacher job satisfaction and commitment to teaching, which is consistent with other research reviewed.

Most of these studies concerning teacher retention found salary to be a direct and significant factor in teacher retention (Tai, Liu, & Fan, 2007; Gardner, 2010; Hughes, 2012; Kaufman & Al-Bataineh, 2011). Most of these studies also indicated administrative support largely influenced teachers' decisions to stay in or leave the teaching profession (Boyd et. al., 2012; Brown & Wynn, 2009; Certo & Fox, 2002; Gardner, 2010; Greenlee & Brown, 2009; Kaufman & Al-Bataineh, 2011). Many of these studies also indicated influence over classroom and school policies and practices was a factor that impacted the decision to remain in teaching (Boyd et. al., 2012; Certo & Fox, 2002; Gardner, 2010; Greenlee & Brown, 2009; Hughes, 2012; Tai, Liu, & Fan, 2007). Stress was also found to have an impact on teacher retention, especially if you

include paperwork and workload as factors impacting the stress construct (Certo & Fox, 2002; Gardner, 2010; Hughes, 2012). Some of the studies also correlate teacher job satisfaction to job commitment (Gardner 2010; Hughes, 2012; Kaufman & Al-Bataineh, 2011). These studies about why teachers choose to stay in the profession are summarized in Table 2.2.

Table 2.2

Why Teachers Stay in the Profession

Study	Study Setting	Key Findings	Type of Analysis	Dependent Variable
Factors Influencing Retention of Mathematics and Science Teachers in Secondary School – A Study based on SASS/TFS (Tai, Liu & Fan, 2007)	Data was obtained by linking surveys from the SASS from 1999-2000 and the TFS from 2000-2001. The selected sample for analysis included 916 mathematics and science teachers.	Teachers in a higher earning bracket were 1.46 times more likely to stay in teaching as compared to the lower salary bracket. Teachers that reported a higher salary satisfaction rating are 1.37 times more likely to stay in the same school.	Quantitative – Binary Logistic Regression	The purpose was to determine the impact of school and teacher characteristics, and salary satisfaction on the dependent variable, teachers that stay in teaching.
Should I Stay or Should I Go? Factors that Influence the Retention, Turnover, and Attrition of K-12 Music Teachers in the United States (Gardner, 2010)	The study included data from 1,903 K-12 music teachers across the United States that was from the SASS.	Retention and turnover rates are comparable to other types of teachers. Perceptions of the work place have direct effects on job satisfaction, and thus, retention, turnover, and attrition.	Quantitative – Multivariate	Variables were measured to analyze their impact on job satisfaction. The same variables and job satisfaction were then analyzed to measure their impact on teacher retention or attrition.
Teacher Retention: Teacher Characteristics, School Characteristics, Organizational Characteristics and Teacher Efficacy (Hughes, 2012)	Researchers surveyed of a random sample of school teachers in a southern state and acquired a stratified random sample from 200 schools. The total number of usable surveys was 789.	The researcher found 14 predictors: years of experience, SES status, salary. Based on the analysis of the data, the researcher recommends increasing salaries, decreasing workloads, and improving parent/student cooperation.	Quantitative – Multiple regression analysis	The conceptual framework looked at teacher and school characteristics that were factors that impacted the dependent variable, the impact on teacher retention.
Factors that Influence Teacher Retention. (Kaufman & Al-Bataineh, 2011)	This sample included 97 certified teachers in their first five years of teaching in a school division in central Illinois.	Cooperation among staff and admin. support and salary were key components to teacher retention.	Quantitative – Descriptive	Factors that influence the retention of teachers in their first five years of teaching in a school district in Illinois.

Recruiting Effective Math Teachers: Evidence from New York City. (Boyd et. al., 2012)	The survey was distributed to all first year teachers in New York City and completed by 4,360. Most questions came directly from the SASS to investigate attrition and retention among first-year teachers.	Better working conditions resulted in better retention. Administrative support was particularly highly correlated and the strongest predictor of retention relative to teachers leaving the profession.	Quantitative – Multinomial logistic regression	The dependent variable measured whether the teacher stayed at the same school, changed schools in the division, or left all together.
Retaining Teachers in Challenging Schools. (Greenlee & Brown, 2009)	Convenience sampling was used by acquiring participants enrolled in the education leadership program at the University of South Florida. The total number of participants was 97.	The findings from this study show that financial incentives, working conditions, and principal leadership behaviors all play an important role in recruiting and retaining teachers in challenging schools.	Quantitative – Descriptive	The purpose was to determine those variables which have the greatest impact on creating a school culture where teachers will want to stay.
Retaining Quality Teachers (Certo & Fox, 2002)	Focus groups from seven Virginia school divisions used interviews and phone interviews to gather information regarding major factors the influence teacher retention and attrition factors.	Consistent results included insufficient salary, lack of admin. support, lack of planning time and stress were top reasons teachers leave teaching. These factors impact teachers' sense of professionalism, job satisfaction, thus, impact the likelihood of teachers' staying.	Qualitative	Job satisfaction and the likelihood of teachers' remaining in their schools.
Finding, Supporting, and Keeping: The Role of the Principal in Teacher Retention Issues (Brown & Wynn, 2009)	Semi-structured interviews with twelve principals were conducted to identify common strategies and characteristics used among administrations to retain teachers. The study included principals from a small urban school district in a southeastern state.	Lower levels of teacher attrition and migration have consistently been found in schools with more administrative support, higher levels of faculty decision making, influence, and autonomy.	Qualitative	Semi-structured interviews were designed to identify common characteristics and strategies that administrators employ to retain teachers.

Summary of the Literature

Research studies have highlighted two important findings. First, that well-qualified teachers are the most influential factor in increasing student achievement, and secondly, most states face drastic teacher shortages in the coming years. (Ingersoll, 2001; Leithwood, Seashore Louis, Anderson, & Wahlstrom, 2004). The literature concerning voluntary teacher turnover and retention factors among qualified teachers includes an array of factors, but common themes have emerged from the research. Teacher satisfaction has been shown to be impacted by stress (Fisher, 2011). Furthermore, teacher satisfaction has also been a strong predictor of teacher intentions to stay or leave the profession (Ingersoll & Smith, 2003; Curtis, 2012; Gardner, 2010).

The factors that have the greatest impact on teacher satisfaction and intent to stay, according to the literature include the following constructs: administrative support, salary satisfaction, influence over classroom and school policies and practices, stress (Ingersoll, 2001; Ingersoll & Smith, 2003; Sedivy-Benton & Boden McGill, 2012; Curtis, 2012). Because salary satisfaction is highly correlated to turnover, this variable should be included in the models predicting teacher retention (Curtis, 2012; Garcia, Slate, & Delgado 2009; Hughes 2012; Ingersoll, 2001; Ingersoll & Smith 2003; Kaufman & Al-Bataineh 2011; Sedivy-Benton & Boden McGill, 2012; Tai, Liu, & Fan, 2007).

Although much research has identified factors that lead to a teacher's intent to stay in the profession, only a few studies have centered on retention of teachers who are considered "high need". This study is intended to add to the growing body of literature concerning the factors that have the greatest impact on a group of "high need" teachers. It is important to study factors that impact high school math and science teachers

separately from all K-12 teachers because the factors and level of influence may be different. Also, different geographic locations may have very different results, so this proposed study is going to focus on factors that impact math and science teacher job satisfaction and intent to the stay in the teaching profession in a region of central Virginia.

Chapter 3: Research Methods

Secondary math and science education are often classified as high need areas because of the shortage of highly qualified math and science teachers. The shortage of qualified math and science teachers can be attributed, at least in part to, turnover (Curtis, 2012; Ingersoll, 2010; Ingersoll & Smith, 2003; Tai, Liu, & Fan, 2007). Factors impacting teacher attrition and retention needs to be investigated in order for administrators and policymakers to better understand how to prioritize their resources to address the shortage. In central Virginia, as with many regions, there is a need for the retention of qualified secondary math and science teachers to facilitate a stronger math and science educational program for students.

The conceptual framework of this study for evaluating secondary math and science teachers' job satisfaction and intent to stay, as shown in Figure 3.1, was operationalized using questions from the School and Staffing Survey (SASS), which have been used in many other studies and are commonly accepted as valid in education research (Gardner, 2010; Ingersoll, 2001; Ingersoll & Perda, 2010; Sedivy-Benton & Boden McGill, 2012; Tai, Liu, & Fan, 2007). According to the National Center for Education Statistics (2011) the topics covered on SASS are extensive including, but not limited to, teacher perceptions of school climate, problems, teacher compensation, and retention.

The goal of this study was to determine the variables that were significant predictors of job satisfaction and retention of math and science teachers in a region in

central Virginia. Appendix D contains the list of questions used in this study in the order they will be presented to participants. Controls for this study included: main teaching assignment, years of experience, teaching certificate, gender, and age. These controls were selected because of their frequency used in similar studies (Gardner, 2010; Ingersoll, 2001; Kaufman & Al-Bataineh, 2011; Kersaint et. al., 2006; Sass et. al., 2012; Sedivy-Benton & Boden McGill, 2012; Tai, Liu, Fan, 2007). Teaching assignment was included as a measure so the study could examine any potential differences and similarities between math and science teachers. Years of experience was also used as a control since previous studies have shown experience levels are associated with turnover intensions (Boyd et. al., 2012; Hughes, 2012; Ingersoll, 2001; Ingersoll & Smith, 2003; Sass et. al., 2012). Also, similar studies have controlled for teacher certification, gender, and age, in an effort to better understand the relationship between demographics and teacher retention and turnover. Age is also included as a control since teachers may enter the profession at different points in their lives.

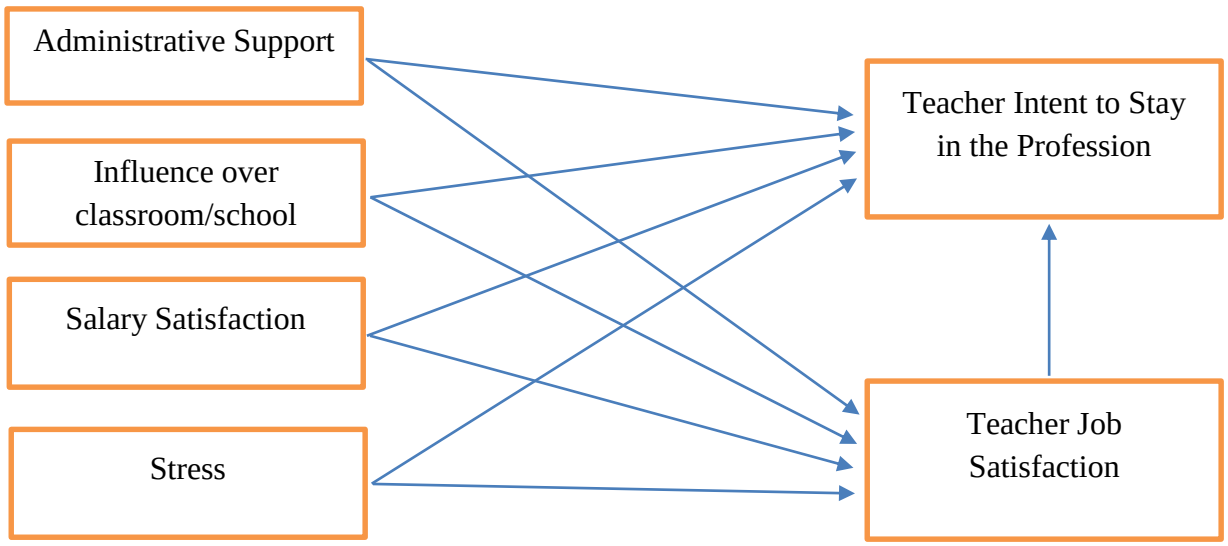

Figure 3.1 Conceptual Model

H_1 – Teacher perception of administrative support will be positively associated with job satisfaction.

H_2 – Teacher perception of influence over classroom and school policies and practices will be positively associated with job satisfaction.

H_3 – Greater teacher satisfaction with salary will be positively associated with job satisfaction.

H_4 – Greater perceived stress by teachers will be negatively associated with job satisfaction.

H_5 – Greater perceived administrative support will be positively associated with teacher intent to stay in teaching.

H_6 – Greater perceived influence over classroom and school policies and practices will be positively associated with the intent to stay in teaching.

H_7 – Greater teacher satisfaction with salary will be positively associated with the intent to stay in teaching.

H_8 – Greater perceived stress by teachers will be negatively associated with the intent to stay in teaching.

H_9 – Greater job satisfaction will be positively associated with the intent to stay in teaching.

Measurement of Independent and Dependent Variables

As shown in Figure 3.1., the model includes four independent variables when measuring job satisfaction as a dependent variable. The model also used the same four independent variables and job satisfaction as independent variables to measure the

dependent variable, teacher intent to stay in the profession. This section describes how each variable was measured and organized by the variables listed below.

Dependent Variables

Teacher Job Satisfaction

Intent to Stay in Teaching

Independent Variables

Perception of Administrative Support

Influence over Classroom and School Policies and Procedures

Salary Satisfaction

Stress associated with teaching

Control Variables

Teaching Assignment (Math or Science)

Hours Spent on Teaching and Related Activities in a Typical Week

Certification

Years of Experience

Gender

Age

The survey questions selected from the SASS (School and Staffing Survey) included questions about school climate and teacher attitudes. The questions were organized into four constructs; perceived administrative support, salary satisfaction, teacher perceived influence on school policy and control of the classroom, and stress. Also questions from the SASS were used to determine job satisfaction among the participants. Teachers were also asked how long they intend to remain in teaching and

responses range can range from “Definitely plan to leave as soon as I can” to “As long as I am able”. The intent of the study was to determine significance among the independent variables to predict the dependent variables and to establish which factors have the greatest influence, if any, on a teacher’s job satisfaction and intent to stay in the teaching profession.

The first dependent variable was teacher job satisfaction which was measured using a Likert Scale with the choices of strongly agree, somewhat agree, somewhat disagree, strongly disagree (one to four). All of the questions in this construct come from the Teacher Questionnaire Schools and Staffing Survey and has been used in other research studies to measure teacher job satisfaction levels (Gardner, 2010; Ingersoll & Smith, 2003). Each question starts with the same first statement, “To what extent do you agree or disagree with the following statement.” The statements concerning job satisfaction are as follows:

1. I am generally satisfied with being a teacher at this school.
2. The teachers at this school like being here; I would describe us as a satisfied group.
3. I like the way things are run at this school.
4. State or district content standards have had a positive influence on my satisfaction with teaching.
5. I don’t seem to have as much enthusiasm now as I did when I began teaching.

This last question concerning job satisfaction does not use the same choices and is as follows:

- If you could go back to your college days and start over again, would you become a teacher or not? The choices to this question are: (1) Certainly would become a teacher, (2) Probably would become a teacher, (3) Chance about even for and against, (4) Probably would not become a teacher, and (5) Certainly would not become a teacher.

The second dependent variable was teacher intention to stay in or leave the teaching profession. The single question came from the Teacher Questionnaire Schools and Staffing Survey and has been used in other studies (Sedivy-Benton & Boden McGill, 2012). The question is as follows:

1. How long do you plan to remain in teaching?

The choices are: (1) As long as I am able, (2) Until I am eligible for retirement benefits from this job, (3) Until I am eligible for retirement benefits from another job, (4) Until I am eligible for Social Security benefits, (5) Until a specific life event occurs (e.g. parenthood, marriage), (6) Until a more desirable job opportunity comes along, (7) Definitely plan to leave as soon as I can, (8) Undecided at this time.

The independent variables included perceived administrative support, influence over classroom/school, salary satisfaction, and stress. Job satisfaction was used as an independent variable to measure how well it predicted teacher intent to stay in or leave the teaching profession.

For the independent variable of perceived administrative support, the Likert Scale used was strongly agree, somewhat agree, somewhat disagree, strongly disagree (one to four). These questions from the Teacher Questionnaire School and Staffing Survey have been used in other studies to measure the level of perceived administrative support

reported by participants (Boyd et. al., 2012; Ingersoll, 2001; Ingersoll & Smith, 2003). Each question starts with the same first statement, "To what extent do you agree or disagree with the following statement." The statements concerning administrative support are as follows:

1. The school administration's behavior toward the teachers is supportive and encouraging.
2. Necessary materials such as textbooks, supplies, and copy machines are available as needed by the teachers.
3. The school administration enforces school rules for student conduct and backs me up when I need it.
4. In this school, teachers are recognized for a job well done.
5. I am given the support I need to teach students with special needs.
6. The school administration knows what kind of school they want and has communicated it to the teachers.

For the independent variable of perceived influence over classroom and school policies and practices, I used questions from the SASS in the corresponding sections under school climate and teacher attitudes. Questions in this section have been used in studies to measure a teacher's perceived influence in their school and classroom in other studies (Boyd et. al., 2011; Gardner, 2010; Ingersoll, 2001; Ingersoll & Smith, 2003; Sedivy Benton & Boden McGill, 2012). For the independent variable of perceived influence over classroom and school policies and practices, the Likert Scale has the response choices: no influence or no control, minor influence or minor control, moderate

influence or moderate control, a great deal of influence or a great deal of control (one to four). The statements concerning influence over classroom / school are as follows:

1. How much actual influence do you think teachers have over school policy at this school in establishing curriculum?
2. How much actual influence do you think teachers have over school policy at this school in determining the content of in-service professional development programs?
3. How much actual control do you have in your classroom at this school over selecting textbooks and other instructional materials?
4. How much actual control do you have in your classroom at this school over selecting content, topics, and skills to be taught?
5. How much actual control do you have in your classroom at this school over selecting teaching techniques?
6. How much actual control do you have in your classroom at this school over evaluating and grading students?
7. How much actual control do you have in your classroom at this school over disciplining students?
8. How much actual control do you have in your classroom at this school over determining the amount of homework to be assigned?

There was only one question to measure the independent variable of salary satisfaction. This question from the SASS has been used in other studies to measure teacher satisfaction with salary (Ingersoll, 2001; Ingersoll & Smith, 2003; Sedivy-Benton

& Boden-McGill, 2012; Tai, Liu, & Fan, 2007). The Likert Scale is strongly agree, somewhat agree, somewhat disagree, strongly disagree (one to four).

1. To what extent do you agree or disagree with the following statement? I am satisfied with my teaching salary.

The measure of stress associated with teaching used a question other studies have used from the SASS concerning stress as it relates to the teaching profession. (Gardner, 2010; Sass et. al. 2012). For the independent variable of stress, the question used a Likert Scale with the choices of strongly agree, somewhat agree, somewhat disagree, strongly disagree (one to four). The question started with the statement, "To what extent do you agree or disagree with the following statement." The statement concerning stress is as follows:

1. The stress and disappointments involved in teaching at this school aren't really worth it.

There will also be several controls in this survey. The control choices were based on the frequency of their use in similar studies (Gardner, 2010; Ingersoll, 2001; Kaufman & Al-Bataineh, 2011; Kersaint et. al., 2006; Sass et. al., 2012; Sedivy-Benton & Boden McGill, 2012; Tai, Liu, Fan, 2007). The control questions are as follows:

1. This school year, what is your main teaching assignment field at this school? Choices include: Math, Science, or Other (please specify)
2. Including hours spent during the school day, before and after school, and on the weekends, how many hours do you spend on ALL teaching and other school-related activities during a typical FULL WEEK at this school? (Open Response)

3. Excluding time spent on maternity/paternity leave or sabbatical, how many school years have you worked as a teacher? Include the current school year. (Open Response)
4. Which of the following describes the teaching certificate you currently hold that certifies you to teach in this state? Choices include: (1) Regular or standard state certificate or advanced professional certificate, (2) Certificate issued after satisfying all requirements except the completion a probationary period, (3) Certificate that requires some additional coursework, student teaching, or passage of a test, (4) Certificate issued to person who must complete a certification program in order to continue teaching, (5) I do not hold an of the above certifications in this state.
5. Are you male of female? (Male or Female)
6. What is your year of birth? (Open Response)
7. Is there anything else you would like to add? (Open Response)

Sample

The participants were full time, current secondary math and science teachers in one region as determined by Virginia Governor's Schools. The Virginia Department of Education sponsors regional Academic-Year Governor's Schools that serve gifted high school students during the academic year. There are currently 19 Governor's Schools in Virginia that provide students with acceleration and exploration. Each of these Governor's Schools serves one of the nineteen regions throughout Virginia. The selected region for this proposed study encompasses five school divisions with ten high schools and one Governor's school.

Survey Procedures

Central office school administrators was first contacted to ensure their willingness to participate in the study. Next, an email with a link to the survey was sent to all current math and science teachers at each of the schools in the fall of the 2015-2016 school year. The total number of potential participants is estimated to be 167 and they are listed by school in Table 3.1. The information will be collected by visiting the websites of each high school and/or talking with an administrator from that division as necessary.

Table 3.1

Math and Science Teachers

	Quantity	Percentage
School A	26	15.6
School B	11	6.6
School C	16	9.6
School D	8	4.8
School E	14	8.4
School F	8	4.8
School G	24	14.4
School H	16	9.6
School I	22	13.2
School J	17	10.2
School K	5	3.0
Total	167	100.0

The surveys were distributed electronically via SurveyMonkey to the approximately 167 math and science teachers. One week later, the surveys were redistributed with the survey link to teachers that did not reply to the first email. A third

and final survey link was sent electronically one week after the second attempt. This last attempt to get more respondents was sent as an email to participants that had not

Data Analysis

The data collected by SurveyMonkey was exported into IBM SPSS for analysis. The data was first described using descriptive statistics to determine demographic information about the participants. Then the independent and dependent constructs were analyzed to establish the reliability of the indices. Bivariate correlations using the Pearson Coefficient were used to determine the relationship between key constructs. Finally, multivariate analyses or Ordinary Least Squares linear regressions were performed to determine the predictive power of variables on the final dependent variable, teacher intent to stay in the teaching profession. Tolerance and Variance Inflation Factors (VIF) were also computed to examine the regression models for multicollinearity.

Summary

The purpose of this study was to investigate the factors that influence math and science teachers' intentions to stay in or leave the teaching profession. The questions were largely derived from the SASS and employed to examine math and science teachers in a region of central Virginia. After receiving approval from all of the school divisions to conduct this study, all math and science teachers in the region were invited to participate and sent a survey link.

The conceptual model (Figure 3.1) illustrates the independent variables used with the first dependent variable, job satisfaction. Those same independent variables and job satisfaction were then used to measure which factors had the greatest influence on the last dependent variable, intent to stay in or leave the teaching profession. The controls used

included: subject taught, hours spent per week, years of experience, and gender. The data collection by SurveyMonkey was exported into IBM SPSS for analyses. First, descriptive identified characteristics of the participants. Next, bivariate correlations were employed to determine the relationships between key variables. Finally, multivariate analysis were used to analyze the predictive power of independent variables on each dependent variable in the model.

Chapter 4: Analysis of Data

Introduction

The five public school systems included in this study consisted of 10 different high schools and one Governor's School for science and technology with a total of 167 math and science teachers. Invitations to participate were sent to all potential participants with 144 of those invitations opened electronically via SurveyMonkey (86.2 percent). Of the 144 total invitations opened, 87 participants answered the majority of the questions for an effective study response rate of 52.1 percent.

This chapter presents the results of the analysis of the study's research questions. First, using IBM SPSS Statistics, this chapter describes the sample using descriptive statistics. The second part of the chapter explains how the independent and dependent variables were measured, presents the reliability analyses (Cronbach's Alpha) of the indices used in the study, and describes the variables using the mean and standard deviation. The third section examines the bivariate correlations using the Pearson Coefficient to determine the relationships between key constructs and variables in the study. Finally, this chapter presents the multivariate analysis or Ordinary Least Squares linear regression results examining the study's model.

Demographics: Description of Survey Respondents

Table 4.1 presents the results of the demographics of the 87 participants which indicates more female teachers responded to the survey (62.1%) than male teachers (37.9%). Table 4.1 also shows the teaching experience of the respondents categorized in five-year increments. The quantities and percentages of the participants' gender and teaching area (math or science) is also included in Table 4.1.

Table 4.1

Demographics of Participants

	Quantity	Percentage
Gender		
Male	33	37.9
Female	54	62.1
Years of Experience		
0 - 5	21	24.1
6 - 10	14	16.1
11 - 15	25	28.7
16 - 20	10	11.5
21 - 25	5	5.7
26+	12	13.8
Subject		
Math	44	50.6
Science	43	49.4

Measurement of Variables in the Model

Independent Variables

The proposed model for this study, as presented in Chapter 3, consisted of four independent constructs that were hypothesized to influence a teacher's level of satisfaction and their intent to remain in or leave the teaching profession. The four

independent variables were: perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress associated with teaching.

For the first construct in the model, perceived administrative support, the survey consisted of six statements to measure this construct using items from the SASS.

1. The school administration's behavior toward the teachers is supportive and encouraging.
2. Necessary materials such as textbooks, supplies, and copy machines are available as needed by the teachers.
3. The school administration enforces school rules for student conduct and backs me up when I need it.
4. In this school, teachers are recognized for a job well done.
5. I am given the support I need to teach students with special needs.
6. The school administration knows what kind of school they want and has communicated it to the teachers.

The responses to the items used to measure the construct utilized a 4-point Likert scale for each question. The range of responses were "Strongly Disagree" (1.0), "Somewhat Disagree" (2.0), "Somewhat Agree" (3.0), and "Strongly Agree" (4.0). A higher number, therefore, represents a more positive perception of administrative support.

A Cronbach's Alpha was calculated to determine the internal reliability among these responses resulting in a Cronbach's alpha value of .83. According to George and Mallery (2014), a Cronbach's Alpha of greater than .70 ($\alpha > .70$) is considered acceptable while a Cronbach's Alpha of greater than .80 ($\alpha > .80$) is considered good. Given the

high internal reliability, it was appropriate to use an additive index of the six items. The response values were added and divided by the number of items to get an average.

As shown in Table 4.2, the administrative support mean was 3.03 and the standard deviation was 0.59. In general, teachers somewhat agreed, on average, that they were supported by the administration.

Table 4.2

Independent Variable Indices

Variable	Valid	Mean	SD	Minimum	Maximum
Admin.	86	3.03	0.59	1.33	4.00
Influence	86	2.78	0.51	1.50	4.00
Salary	86	1.85	0.91	1.00	4.00
Stress	86	2.63	0.95	1.00	4.00

The next construct in the model, influence on classroom and school policies and procedures, also used questions from the SASS:

1. How much actual influence do you think teachers have over school policy at this school in establishing curriculum?
2. How much actual influence do you think teachers have over school policy at this school in determining the content of in-service professional development programs?
3. How much actual control do you have in your classroom at this school over selecting textbooks and other instructional materials?
4. How much actual control do you have in your classroom at this school over selecting content, topics, and skills to be taught?

5. How much actual control do you have in your classroom at this school over selecting teaching techniques?
6. How much actual control do you have in your classroom at this school over evaluating and grading students?
7. How much actual control do you have in your classroom at this school over disciplining students?
8. How much actual control do you have in your classroom at this school over determining the amount of homework to be assigned?

The responses to the items used to measure the construct utilized a 4-point Likert scale for each question. The range of responses were "No Influence" (1.0), "Minor Influence" (2.0), "Moderate Influence" (3.0), and "A great deal of influence" (4.0). A higher number represents a more positive perception of greater teacher influence over classroom and school policies and procedures.

A Cronbach's Alpha was calculated to determine the internal reliability among these responses resulting in a Cronbach's alpha value of .79, which is considered an acceptable value (George & Mallery, 2014). Given the high internal consistency, it was appropriate to again create an additive index of the eight items and divide it by the total number of items so that the index scale is consistent with the scale used to measure the items in the survey. As shown in Table 4.2, the influence over classroom and school policies and procedures mean was 2.78 and the standard deviation was 0.51.

The construct of salary satisfaction was measured with a single response to the following statement.

- To what extent do you agree or disagree with the following statement? I am satisfied with my teaching salary.

The range of responses were "Strongly Disagree" (1.0), "Somewhat Disagree" (2.0), "Somewhat Agree" (3.0), and "Strongly Agree" (4.0). A higher number represents greater reported satisfaction regarding teacher salary. As shown in Table 4.2, teachers, on average, disagreed that they were satisfied with their salary (mean = 1.85, standard deviation = 0.91). A total of 39 respondents (44.8%) strongly disagreed with the statement that they were satisfied with their teaching salary while another 26 respondents (29.9%) somewhat disagreed. Only 18 (20.7%) somewhat agreed with the statement about salary satisfaction while four said they strongly agreed. The teachers overwhelmingly (74.7%) either strongly disagreed or somewhat disagreed with the statement that they were satisfied with their teaching salary.

Stress and disappointments, as it relates to teaching, was measured with a response to a statement from the SASS. The responses used a 4-point Likert Scale with the choices of Strongly Agree (1.0), Somewhat Agree (2.0), Somewhat Disagree (3.0), and Strongly Disagree (4.0). The statement was as follows, "To what extent do you agree or disagree with the following statement."

- The stress and disappointments involved in teaching at this school aren't really worth it.

Higher values indicate a greater disagreement with the negative statement. The coding, therefore, is in the opposite direction to ensure that the higher numbers still have a positive correlation with the teacher's belief that despite the stress and disappointments associated with teaching, it is in fact worth remaining in the teaching profession. The

minimum and maximum values in Table 4.2 are the lowest and highest values from the survey. Also, as shown in Table 4.2, whether the stress of teaching is worth it, had a mean of 2.63 and a standard deviation of 0.95. A total of 10 teachers (11.6%) strongly agreed and another 30 (34.9%) somewhat agreed that the statement that the stress and disappointments involved in teaching aren't really worth it. A total of 28 respondents (32.6%) somewhat disagreed and another 18 strongly disagreed with the statement indicating that they felt the stress and disappointments involved with teaching were in fact, worth it. The responses to this statement were split almost evenly among teachers who felt the stress and disappointments were not worth it (46.5%) and the remaining respondents (53.5%) who felt they were worth it.

Dependent Variables

The first dependent variable measured was job satisfaction. The survey consisted of six statements to measure this construct, five of which are listed below.

1. I am generally satisfied with being a teacher at this school.
2. The teachers at this school like being here; I would describe us as a satisfied group.
3. I like the way things are run at this school.
4. State or district content standards have had a positive influence on my satisfaction with teaching.
5. I don't seem to have as much enthusiasm now as I did when I began teaching.

The range of responses were Likert scale and included, "Strongly Disagree" (1.0), "Somewhat Disagree" (2.0), "Somewhat Agree" (3.0), and "Strongly Agree" (4.0). A higher number represents greater job satisfaction. The fifth question was coded in the

opposite direction because the statement was negative. This last question concerning job satisfaction did not use the same choices.

- If you could go back to your college days and start over again, would you become a teacher or not? The choices to this question are: (1) Certainly would become a teacher, (2) Probably would become a teacher, (3) Chance about even for and against, (4) Probably would not become a teacher, and (5) Certainly would not become a teacher.

A Cronbach's Alpha was calculated to determine the internal consistency among these responses, resulting in a Cronbach's alpha value of .84. The responses to this item utilized a 4-point Likert scale for each question. The range of responses were from 1.0, "Certainly would not become a teacher" to 5.0, "Certainly would become a teacher." The higher the number, the greater the odds that the participant would choose the teaching profession again. Given the high internal validity, it was appropriate to again create an additive index of the six items so that the index scale is consistent with the scale used to measure the items in the survey. As shown in Table 4.3, the job satisfaction mean was 2.55 and the standard deviation was 0.66.

Table 4.3

Job Satisfaction Index

Variable	Valid	Mean	SD	Minimum	Maximum
Job Sat.	84	2.55	0.66	1.00	3.86

The final dependent variable was the intent to leave or stay in the teaching profession and this variable was measured with a single statement.

- How long do you plan to remain in teaching?

The choices were: (1) As long as I am able, (2) Until I am eligible for retirement benefits from this job, (3) Until I am eligible for retirement benefits from another job, (4) Until I am eligible for Social Security benefits, (5) Until a specific life event occurs (e.g. parenthood, marriage), (6) Until a more desirable job opportunity comes along, (7) Definitely plan to leave as soon as I can, (8) Undecided at this time.

The responses were combined into three categories, the first (1.00) were those participants who intended to leave as soon as possible. The next group (2.00) included participants who would leave when a specific life event occurred, or a more desirable opportunity came along, or who said they were undecided at this time. These responses were grouped together at a "2.0" because the respondents did not intend to stay until retirement or stated that they were undecided, demonstrating that they were not committed to teaching for the long-term. The final category (3.00) combined the responses about staying as long as possible, until retirement benefits, or social security benefits. These last responses could be grouped together because they all indicate the teacher's commitment to staying in the teaching profession for an extended time.

There were 88 total valid responses to this statement with six (6.8%) indicating that they intend to leave as soon as possible. Another 37 (42.0%) stated that they would leave after a specific life event or when a more desirable opportunity came along. The remaining 45 respondents (50%) plan to stay as long as possible, until retirement, or until they can collect social security. (See Table 4.4)

Table 4.4

Intent to Leave of Stay in the Teaching Profession

Variable	Valid	Mean	SD	Minimum	Maximum
Intent	88	2.44	0.62	1.00	3.00

Correlation Analyses

This section presents the correlational analyses of the variables included in the model, focusing on the relationship between the independent variables and the dependent variables. As shown in Table 4.5, all of the independent variables were significantly correlated with job satisfaction ($p < .01$). Two of the independent variables were moderately correlated, influence school and classroom index and salary satisfaction ($r = .49$, $r = .49$, respectively) and two were strongly correlated, administrative support index and stress with teaching ($r = .67$ and $r = .79$, respectively). In addition, the two dependent variables, job satisfaction and intent to remain in the profession, are moderately and significantly correlated ($r = .36$).

Table 4.5

Correlations With Job Satisfaction - DV 1

Variable	Intent	Admin.	Influence	Salary	Stress
Job Sat.	0.36***	0.64***	0.49***	0.49***	0.79***

Notes.
*** Correlation is significant at the 0.01 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
* Correlation is significant at the .10 level (2-tailed).

As shown in Table 4.6, all of the independent variables were correlated with intent to stay in the teaching profession at the .10 level. Administrative support was correlated with intent to stay in the profession at the .05 level (r = .22). Two of the independent variables were moderately correlated, salary satisfaction and stress with teaching (r = .28, r = .44, respectively). Although the correlations between the independent variables and the dependent variable of intent to stay in the teaching profession was significant, they were not as highly correlated as the independent variables with the dependent variable of job satisfaction (See Table 4.5 and Table 4.6).

Table 4.6

Correlations With Intent to Leave or Stay in Teaching - DV 2

Variable	Admin.	Influence	Salary	Stress
Intent	0.22**	0.18*	0.28***	0.44***

Notes.
*** Correlation is significant at the 0.01 level (2-tailed).
** Correlation is significant at the 0.05 level (2-tailed).
* Correlation is significant at the 0.10 level (2-tailed).

Multivariate Analyses Examining Study's Model

As shown in Table 4.7, the study used Ordinary Least Squares linear regression to examine the conceptual model. The study first examined the relationships between the independent variables and job satisfaction (see Figure 3.1). Next, the study examined the relationships between the independent variables and the dependent variable of teacher intent to remain in the teaching profession. In addition, the regression models included the following controls: teaching assignment (math or science), years of experience as a teacher, and gender. The question concerning the number of hours spent teaching,

planning, or on school related activities, was omitted from the model because the results were unreliable. Also, the control of teaching certification was omitted because of low sample variance. Finally, the control of age was highly correlated to years of experience, so the model only included the number of years of experience for analyses.

Table 4.7 presents the results from the first regression model explaining job satisfaction. The regression model (n = 81) explained 71.8% of the variance (r = .85, r^2 = .72, adjusted R square = .69) and was statistically significant (F = 26.59, p < .001). The results indicated that three of the independent variables and one control were significant predictors of job satisfaction. The independent variables were highly correlated, and so they were tested for multicollinearity. To test for issues concerning multicollinearity, a formal detection tolerance or the variance inflation factor (VIF) was computed and none were found to be unacceptable. As a rule of thumb, tolerance levels higher than .10 are acceptable (Tabachnick & Fidell, 2001). Variance inflation factors should be 10 or less according to Hair et. al. (1995). In Table 4.7, the variable with the lowest tolerance and highest VIF was the administrative support index (Tol. = 0.41, VIF = 2.41) which is still well within the acceptable range.

Table 4.7

Results of Regression - Job Satisfaction - DV 1

Ind. Variable	Unstandardized	Standardized	t	Tolerance	VIF
Admin.	0.28**	0.26	2.65	0.41	2.41
Influence	- 0.01	-0.01	-0.12	0.51	1.95
Salary	0.13**	0.18	2.47	0.76	1.31
Stress	0.38***	0.56	6.56	0.54	1.87
Science/Math	-0.07	-0.05	-0.81	0.91	1.10
Years of Exp.	-0.01*	-0.12	-1.97	0.97	1.04
Gender	-0.14	-0.10	-1.54	0.90	1.11

Notes.
*** Significant at the 0.01 level (2-tailed).
** Significant at the 0.05 level (2-tailed).
* Significant at the 0.10 level (2-tailed).

The study results support three of the four hypotheses (H_1, H_3, and H_4). As shown in Table 4.7, a one unit increase in perceived administrative support result in a 0.28 unit increase in job satisfaction (H_1). As posited, the study results demonstrated that salary satisfaction was found to be a significant predictor as each unit increase resulting in a 0.13 unit increase in job satisfaction (H_3). Stress related to the teaching profession was found to be a significant predictor as each unit increase, which indicates less stress, result in a 0.38 unit increase in job satisfaction (H_4).

Contrary to expectations, influence over school and classroom policies and procedures was not significantly related to job satisfaction in this model, and thus the study does not support hypothesis H_2.

Only one of the control variables, years of experience, was significant. The more years of experience as a teacher had, the less satisfied they were (b = -0.01). Neither the

subject taught (math or science) nor the gender of the participant, were significantly correlated with job satisfaction in this model. (See Table 4.7)

The standardized coefficients determine which variables have the greatest influence on the dependent variable, which in this model was job satisfaction. The stress and disappointments associated with teaching had the single greatest influence on job satisfaction with a standardized coefficient of 0.56. Perceived administrative support had a standardized coefficient of 0.26 and the next greatest influence on the dependent variable of job satisfaction. Satisfaction with teaching salary was third most important with a standardized coefficient 0.18. Finally, years of experience had a standardized coefficient of -0.12 and the fourth greatest influence on job satisfaction among participants.

As shown in Table 4.8, the study next examined the relationships between the independent variables and teacher intent to stay in the teaching profession. In addition, the regression models included the controls of teaching assignment, years of experience, and gender. The tolerance levels and variance inflation factors were also measured to test for issues involving multicollinearity. As shown in table 4.8, the variable with the lowest tolerance and highest VIF was the administrative support index (Tol. = 0.42, VIF = 2.38) which are in the acceptable range.

Table 4.8 presents the results from the second regression model explaining teacher intent to stay in the teaching profession. The model (n = 83) explained 28.2% of the variance ($r = .53$, $r^2 = .28$, adjusted $r^2 = .21$) and was statistically significant ($F = 4.20$, $p \leq .001$). The results indicated that the one of the independent variables and one of the controls were significant predictors of intent to stay in the teaching profession ($p < .01$).

Table 4.8

Results of Regression - Intent to Stay - DV 2

Ind. Variable	Unstandardized	Standardized	t	Tolerance	VIF
Admin.	-0.11	-0.10	-0.69	0.42	2.38
Influence	0.01	0.01	0.09	0.52	1.92
Salary	0.09	0.13	1.14	0.77	1.31
Stress	0.30***	0.45	3.40	0.54	1.85
Science/Math	-0.02	-0.02	-0.17	0.93	1.08
Years of Exp.	0.02***	0.28	2.78	0.97	1.03
Gender	-0.11	-0.09	-0.82	0.90	1.12

Notes.
*** Significant at the .01 level (2-tailed).
** Significant at the .05 level (2-tailed).
* Significant at the .10 level (2-tailed).

The study's results supported one of the four related hypotheses (H_8). As shown in Table 4.8, a one unit increase in the stress variable, which indicates stress associated with teaching is worth it, result in a 0.30 unit increase in teacher intent to stay in the teaching profession. Contrary to expectations, that administrative support index, influence over classroom and school policies and practices index, and salary satisfaction were not significantly related to teacher intent to stay in the teaching profession in this model. Thus, the study does not support hypotheses H_5, H_6, and H_7. The only control variable that was significant was years of experience. The more years of experience a teacher had, the more likely they were to remain in teaching ($b = 0.02$, $p < .01$). Neither the subject taught (math or science) nor the gender of the participant, were significantly correlated with job satisfaction in this model (See Table 4.8).

The standardized coefficients determine the variables' influence on the dependent variable of intent to stay in the teaching profession. The standardized coefficient for stress related to teaching was .45 which indicated a greater influence on the dependent variable than years of experience, which had a standardized coefficient of .28.

Table 4.9 presents the results from the third regression model explaining teacher intent to stay in the teaching profession with the job satisfaction index as an independent variable. The tolerance levels and variance inflation factors were measured to test for issues involving multicollinearity. As shown in Table 4.9, the variable with the lowest tolerance and highest VIF was the job satisfaction index (Tol. = 0.28, VIF = 3.55) which is acceptable. The regression model (n = 81) explained 29.2% of the variance ($r = .54$, $r^2 = .29$, adjusted $r^2 = .21$) and was statistically significant ($F = 3.71$, $p \leq .001$). The model also included the four independent variables used in the two previous regression models and three controls. The results indicated that one independent variable and one control were significant predictors of intent to stay in the teaching profession among respondents. The results were consistent with the model results presented in Table 4.9.

Table 4.9

Results of Regression - Intent to Stay - DV 2

Ind. Variable	Unstandardized	Standardized	t	Tolerance	VIF
Job Sat.	0.10	0.10	0.54	0.28	3.55
Admin.	-0.11	-0.10	-0.62	0.38	2.65
Influence	-0.01	-0.01	-0.07	0.51	1.95
Salary	0.08	0.12	1.00	0.70	1.42
Stress	0.26**	0.39	2.27	0.34	2.96
Science/Math	0.02	0.02	0.15	0.91	1.10
Years Exp.	0.02**	0.31	2.94	0.92	1.09
Gender	-0.09	-0.07	-0.67	0.88	1.14

Notes.
* Significant at the .01 level (2-tailed).
** Significant at the .05 level (2-tailed).
*** Significant at the .10 level (2-tailed).

This model also supports only one of the four related hypotheses and it is the same hypothesis, (H_8). As shown in Table 4.9, a one unit increase in the stress variable, stress of teaching is worth staying in the profession, result in a 0.26 unit increase in teacher intent to stay in the teaching profession. This model included job satisfaction which was not a significant predictor of intent to stay in the teaching profession when controlling for the other independent variables. Contrary to expectations but consistent with the previous analyses, perceived administrative support, salary satisfaction, and influence over classroom and school policies and procedures were not significant predictors of teacher intent to stay in the teaching profession. Thus, this analysis did not support hypotheses H_5, H_6, and H_7. One of the control variables, years of experience, was found to be significant ($b = 0.02$, $p < .01$). Neither the subject taught (math or

science) nor the gender of the participant were significantly correlated with intent to stay in teaching in this model.

The standardized coefficients determined the variables that have the greatest influence on the dependent variable of teacher intent to stay in the teaching profession. The stress and disappointments related to teaching had a standardized coefficient of .39, while the years of experience had a standardized coefficient of .31.

Table 4.10 presents the results from another regression model explaining teacher intent to stay in the teaching profession. This model included job satisfaction as the independent variable of intent to stay in teaching but excluded the other four independent variables. As in prior analyses, the tolerance levels and variance inflation factors were measured to test for issues involving multicollinearity. As shown in table 4.10, the variable with the lowest tolerance and highest VIF was years of experience (Tol. = 0.94, VIF = 1.07) was in the acceptable range. The model (n = 83) explained 22.8% of the variance ($r = .53$, r^2 .29, adjusted $r^2 = .23$) and was statistically significant ($F = 5.75$, $p < .001$). The results indicated that the variable of job satisfaction was a significant predictor of teacher intent to stay in teaching. Years of experience was also significant, which is consistent with the three previous models.

Table 4.10

Results of Regression - Intent to Stay - DV 2

Ind. Variable	Unstandardized	Standardized	t	Tolerance	VIF
Job Sat.	0.41***	0.43	4.19	0.95	1.05
Admin.	0.06	0.05	0.46	0.97	1.03
Yrs. Exp.	0.02**	0.31	3.05	0.94	1.07
Gender	-0.06	-0.05	-0.46	1.00	1.00

Notes.
*** Significant at the .01 level (2-tailed).
** Significant at the .05 level (2-tailed).
* Significant at the .10 level (2-tailed).

Summary

This chapter used descriptive statistics to first identify the characteristics of the respondents including the subject taught (math or science), years of experience, and gender. The second section explained how the independent and dependent variables were measured. Reliability analyses were conducted for the variables that consisted of multiple questions or statements. A Cronbach's Alpha was calculated to determine the internal consistency among the items in each construct. Once Cronbach's Alpha value was determined to be greater than .70 ($\alpha > .70$) and acceptable, tests for correlations among variables were performed.

The correlational analysis with job satisfaction revealed that all of the independent variables (perceived administrative support, influence over classroom policies and practices, salary satisfaction, and stress associated with teaching) and the dependent variable (job satisfaction) were significantly correlated ($p < .01$). The correlational analysis with teacher intent to stay in teaching revealed that all of the

independent variables (perceived administrative support, influence over classroom policies and practices, salary satisfaction, and stress associated with teaching) were significantly correlated with intent to stay in the teaching profession, although the correlations were weaker than those to job satisfaction.

The study next employed Ordinary Least Squares linear regression to examine four models, and summary results are displayed in Table 4.11. The first model used job satisfaction as the dependent variable and included the four independent variables of perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress related to teaching and the three controls of teaching assignment, years of experience, and gender. The results indicated that three of the independent variables (H_1, H_3, and H_4) and one control were significant predictors of job satisfaction. The second regression model used teacher intent to stay as the dependent variable and the same four independent variables (perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress related to teaching) and three controls (teaching assignment, years of experience, and gender). The results indicated that only one independent variable, stress associated with teaching, and one control, years of experience, were significant predictors of the dependent variable of teacher intent to stay. This second regression only supported one of the next four hypotheses (H_8).

The next regression model used teacher intent to stay as the dependent variable and included job satisfaction with the four independent variables (perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress related to teaching) and the three controls (teaching

assignment, years of experience, and gender) as the predictors. This analysis supported the same one of the four hypotheses again (H_8). A final regression analysis was performed using teacher intent to stay in the teaching profession as the dependent variable with the independent variables of job satisfaction, teaching assignment, years of experience, and gender. The result of this final analysis was that job satisfaction and years of experience were significant at $\alpha = .01$and $\alpha = .05$ level, respectively. It is important to note that the years of experience in teaching was the only significant control in all four models. Job satisfaction was an important predictor of intent to stay, but not when the full model was estimated, which is why issues of multicollinearity were also investigated.

A summary of the regression analyses, as shown in Table 4.11, indicates the independent variables of administrative support, salary satisfaction, stress, and experience were all significant predictors of the dependent variable of job satisfaction in Model 1. Model 2 used the dependent variable of intent to stay in the teaching profession and found only stress related to teaching and years of experience to be significant predictors. Model 3 also used the dependent variable of intent to stay in teaching but included job satisfaction as an independent variable. Finally, Model 4 used intent to stay in teaching as the dependent variable, and job satisfaction and years of experience were significant predictors.

Table 4.11

Summary of Regressions

Ind. Variable	Model 1	Model 2	Model 3	Model 4
Job Sat.	—	NS	NS	.00
Admin.	.01	NS	NS	—
Influence	NS	NS	NS	—
Salary	.02	NS	NS	—
Stress	.00	.00	.03	—
Science/Math	NS	NS	NS	NS
Years of Exp.	.05	.01	.00	.00
Gender	NS	NS	NS	NS

Notes.
*** Significant at the .01 level (2-tailed).
** Significant at the .05 level (2-tailed).
* Significant at the .10 level (2-tailed).

Chapter 5: Discussion of Findings and Recommendations

Key Issues from the Literature & Problem Statement

Research has suggested that the single most influential factor in the education of children is the teacher (Ingersoll, 2001; Leithwood, Seashore Louis, Anderson, & Walstrom). Despite the importance of retaining qualified teachers in the classroom, the K-12 teaching occupation has chronic and high turnover compared to most other occupations, which suggests the teaching profession has underlying problems (Ingersoll & Smith, 2003). The United States Department of Education consistently includes secondary math and science among teacher shortage areas (U.S. Department of Education, 2013). Although many studies have focused on the recruitment of math and science teachers, emerging studies indicated the bigger issue is the retention of teachers (Ingersoll, 2001; Cochran-Smith, 2004). High rates of teacher turnover disrupt program planning, continuity, hinder student learning, and increase school districts' expenses on recruiting, hiring, and training (Shen, 2001). The purpose of this study was to explore factors that may be associated with the retention intentions of secondary math and science teachers in central Virginia.

Research Questions

The research questions for this study were developed based on the findings from previous research, and the model tested in this study included four independent variables:

perceived administrative support, teacher influence over classroom and school policies and procedures, salary satisfaction, and stress associated with teaching. The model also included three control variables: primary teaching assignment (math or science), years of experience in teaching, and gender. The dependent variables in this study included (a) job satisfaction among math and science teachers and (b) their intent to stay in the teaching profession. The electronic survey sent via SurveyMonkey to 167 teachers was opened by 144 potential participants. The potential participants included all full-time, math and/or science teachers in central Virginia. A total of 87 participants answered the majority of the questions for an effective study response rate of 52.1%.

This study supported the first hypothesis (H_1), that teacher perception of administrative support would be positively associated with job satisfaction. This finding is consistent with other studies have which have identified teacher perceived administrative support as a significant predictor of job satisfaction (Certo & Fox, 2002; Curtis, 2012; Ingersoll, 2001; Ingersoll & Smith, 2003). The standardized coefficient of .28 indicated a positive linear relationship between perceived administrative support and job satisfaction among the respondents. Therefore, greater perceived administrative support by the teachers in this study was associated with a greater level of job satisfaction.

The second hypothesis (H_2), that teacher perception of influence over classroom and school policies and practices would be positively associated with job satisfaction, was not supported by this study, although the perception of a lack of faculty influence over school and classroom policies and procedures was significant in other studies, such as Ingersoll (2001) and Ingersoll & Smith (2003). It is important to note that the studies

by Ingersoll (2001) and Ingersoll & Smith (2003) used nationwide data from the School and Staffing Survey (SASS) and its supplement, the Teacher Follow-up Survey (TFS), so their number of participants was significantly greater. The study by Ingersoll (2001), for instance, included 6,733 participants, as compared to 87 valid participants for this study.

The third hypothesis (H_3) advanced that greater teacher satisfaction with salary would be positively associated with job satisfaction, and it was supported by the findings. Salary satisfaction has been positively associated with job satisfaction among teachers in other studies as well (Ingersoll, 2001; Ingersoll & Smith, 2003). The results of the Ordinary Least Squares linear regression with salary satisfaction as the independent variable and job satisfaction as the dependent variable was significant at the alpha .05 level for this model. The standardized coefficient of .13 indicated a positive linear relationship between salary satisfaction and job satisfaction. This indicates that, in general, the more satisfied respondents were with their teaching salary, the higher their job satisfaction.

The next hypothesis (H_4) posited that greater perceived stress by teachers would be negatively associated with job satisfaction. The coding was reversed to keep the relationship positive. Stress related to teaching has been negatively associated with job satisfaction among teachers (Certo & Fox, 2002; Fisher, 2001), and the results of the Ordinary Least Squares linear regression, with stress as the independent variable and job satisfaction as the dependent variable, was significant ($p < .001$). Not only did the independent variable of stress have the greatest level of significance, it had the greatest unstandardized and standardized coefficient. This indicated that stress had the greatest

influence on the dependent variable of job satisfaction, with each unit decrease of stress associated with teaching associated with a .38 unit increase in job satisfaction.

Studies have used various combinations of controls to identify predictors for job satisfaction among teachers including years of experience in teaching, gender, and teaching assignment (Fisher, 2011; Ingersoll, 2001). Of the controls tested as predictors of job satisfaction, only years of experience was found to be significant in this study's findings. Interestingly, years of experience was significant ($p < .10$) and the unstandardized coefficient ($\beta = -.01$) indicates a slight negative relationship between years of experience and job satisfaction. In general, the respondents' job satisfaction decreased as their experience level increased.

The study next examined the relationships of the independent variables (perceived administrative support, influence over classroom and school policies and procedures, salary satisfaction, and stress related to teaching) with teacher intent to stay in the teaching profession as the dependent variable. In addition to the independent variables, controls were also included in the model to determine if they influenced intent to stay. This study's results did not support hypotheses H_5, H_6, and H_7 which examined the influence of perceived administrative support, influence over classroom and school policies and procedures, and salary satisfaction (respectively) on the dependent variable of teacher intent to stay in the teaching profession. These results are not consistent with several other studies which have identified perceived administrative support as a significant predictor of a teacher's intent to stay in the teaching profession (Boyd et. al., 2012; Curtis, 2012; Ingersoll, 2001; Sedivy-Benton & Boden McGill, 2012). It is important to note, however, that the study by Sedivy-Benton and McGill (2012) used the

same dependent variable of intent to stay from the SASS and also analyzed data using linear test of least squares but had significant findings using the nationwide data set from the SASS 2007-2008. This study only examined math and science teachers in a region in central Virginia (n = 87) which may account for the difference in results.

The sixth hypothesis (H_6) posited that greater influence over classroom and school policies and practices would be positively associated with the intent to stay in teaching. In a review of the literature, Brown and Wynn (2009) found lower levels of teacher attrition and migration in schools with higher levels of faculty decision making, influence, and autonomy. Other studies have also identified levels of teacher influence over their classroom and/or school as a significant predictor of attrition or retention among teachers (Boyd et. al., 2012; Sedivy-Benton & Boden McGill, 2012). Contrary to expectations, however, this hypothesis was not supported by this study's findings.

The next hypothesis put forth (H_7) examined whether greater teacher satisfaction with salary would be positively associated with the intent to stay in teaching. Previous studies have consistently identified a positive association between teacher salary satisfaction and teacher retention or teacher intent to stay in the teaching profession (Curtis, 2012; Hughes, 2012; Ingersoll, 2001; Sedivy-Benton & Boden McGill, 2012). Although this variable was not statistically significant in this study's findings, teacher salary satisfaction had the lowest index mean of the independent variables tested. Salary satisfaction had the lowest mean of 1.85 as compared to perceived administrative support (3.03), influence over classroom and school policies and procedures (2.78), and stress associated with teaching (2.63). The majority of teachers (74.7%) responded that they either strongly disagreed or somewhat disagreed with the statement that they were

satisfied with their teaching salary, however, more than half (51.1%) were still committed to the teaching profession as long as possible or until retirement.

The next hypothesis examined (H_8) was that greater perceived stress by teachers would be negatively associated with the intent to stay in teaching. Other studies have identified stress related to teaching as having a negative impact on teacher intent to stay in the teaching profession (Boyd et. al., 2012; Certo & Fox, 2002; Hughes, 2012). As described earlier, the coding for this model was reversed to indicate that teachers who believed the stress and disappointments of teaching were, in fact, worth it, would be positively associated with the teacher intent to stay in the teaching profession. This hypothesis was significant ($p \leq .001$) in this study's findings.

Controls of years of experience, gender, and teaching assignment have been identified as predictors of teacher intent to stay in teaching in other studies (Fisher, 2011; Perez, 2012; Sass, Flores, Claeys & Perez, 2012, Tai, Lui, & Fan, 2007). In this study's findings, the only control that was a significant predictor of teacher intent to stay in the teaching profession was years of experience. Neither the primary teaching assignment (math or science) nor gender were statistically significant predictors of intent to stay in the teaching profession in the model.

This study next examined job satisfaction as an independent variable and included the controls with teacher intent to stay in the teaching profession as the dependent variable. Previous studies have positively associated teacher job satisfaction with teacher intent to stay in teaching (Curtis, 2012; Gardner, 2010; Tai, Liu, & Fan, 2007). The final hypothesis (H_9), which posited that greater job satisfaction would be positively associated with the intent to stay in teaching, was tested in the final analysis. The results of the

Ordinary Least Squares linear regression, with job satisfaction as the independent variable and teacher intent to stay in the teaching profession as the dependent variable, was significant ($p < .001$), which supported the last hypothesis (H_9). Of the controls tested, only experience was found to be significant and it had a positive linear relationship with the intent to stay in the teaching profession. This indicates that, as a whole, respondents with more years of experience would be more likely to remain in the teaching profession.

Qualitative Responses

The final question contained in the electronic survey asked participants if there was anything else they would like to add. This allowed participants to give a more in-depth and qualitative response. A total of 42 of the 87 valid participants, for an effective rate of 48.3%, provided optional feedback for this final question. Each response was read and analyzed to identify common themes. Five of the 42 responses (11.9%) were positive and included responses such as, "I love what I do!" and "The school system does a good job at making you feel welcome…" Another seven responses (16.7%) were critical of their current administration and included comments such as, "The administration at this school is not consistent…" and "The administration does not respect our time…"

Critical responses concerning salary also emerged in 10 of the 42 (23.8%) comments and included statements such as, "Teachers do not get paid enough for what we do and have to deal with." Other disparaging comments focused on the lack of teacher pay increases with statements like, "…I still bring home less money than I did in

2008…" Salary was also found in the regression analyses to be a significant predictor of job satisfaction, and so it is not surprising this would emerge as a common theme.

The lack of control over the classroom and school policy and procedures was only mentioned in three of the comments (7.1%), while student behavior was mentioned four times (9.5%). This low frequency of comments regarding influence over classroom and school policy and procedures is not surprising considering the hypotheses regarding influence over classroom and school policies and procedures was not supported as a significant predictor to job satisfaction or to intent to stay in the teaching profession.

The most common theme among all responses concerned stress related to teaching and "other demands." This theme of stress was mentioned in 15 (35.7%) of the 42 responses. Comments included "student load", "-too much stress…", "I am overwhelmed…", and "more and more work has been piled on…" etc. Teachers included extra duties, meetings, unreasonable expectations, mandates, and many other examples as evidence to support their comments concerning stress. Stress as the most common theme among respondents is consistent with the supported hypothesis of stress as a significant predictor of job satisfaction and intent to stay in or leave the teaching profession and the fact that stress was also the independent variable with the single greatest impact on the two dependent variables.

Conclusions and Implications

The three independent variables of perceived administrative support, salary satisfaction, and stress associated with teaching were all significant predictors of job satisfaction among math and science teacher participants in central Virginia. Stress associated with teaching and job satisfaction were significant predictors of intent to stay

in teaching for teachers in this study. Policymakers and stakeholders who want to improve education in areas of math and science should focus on the retention of qualified math and science teachers. Based on the results of this study, resources should be targeted to improve job satisfaction and decrease stress associated with teaching to improve the retention of qualified math and science teachers. The improvement of job satisfaction would be best served, based on the analyses of this study, by improving perceived administrative support, improving salary satisfaction, and decreasing stress associated with teaching.

Limitations

All 167 of the math and/or science teachers in the target region for this study were invited to participate. Of the 144 invitations opened, 87 participants answered the majority of questions for an effective response rate of 51.7%. Although this would be considered a very favorable response rate, it does still mean 48.3% of teachers chose not to participate, thus possibly impacting the results. Also, this study was focused on one region in central Virginia, and so the level of generalizability to other areas may be limited due to differences in geography, socio-economics, urban vs. rural, settings, and so on. Furthermore, the survey was a single snap shot of the perceptions held by the respondents at that time.

The questions were largely derived from the Schools and Staffing Survey (SASS) which is a series of questionnaires used by the National Center for Education Statistic. The SASS questionnaires are used to provide descriptive data about a range of topics including, but not limited to: teacher demand, teacher characteristics, teacher perception of school climate, and teacher compensation. The survey questions used were a subset

chosen to focus on specific constructs deemed significant in previous studies of this topic. The questions, therefore, were chosen by the researcher, and may be subject to question bias.

Suggestions for Future Research

This study adds to the growing literature regarding factors that influence math and science teacher retention decisions. Further studies may examine different geographic regions or replicate the study in different educational settings. Furthermore, the study could be applied to different subject areas to identify similarities or differences. Also, research may be done with teaching levels outside of the high school setting to examine consistencies and discrepancies. Additionally, using a larger sample would seem likely to yield a greater potential for significant results.

Based on the results of this study, examination into the independent variables of perceived administrative support, teacher influence over classroom and school policies and procedures, and whether or not teachers believe that it is worth remaining in the teaching profession given the current levels of stress and disappointments is recommended. These factors were significant predictors of math and science teacher job satisfaction, and job satisfaction was a significant predictor of teacher intent to stay in or leave the teaching profession in central Virginia.

References

Berry, B. (2004). Recruiting and retaining "highly qualified teachers" for hard-to-staff schools. *NASSP Bulletin*, *88*(638), 5-27.

Boyd, D., Grossman, P., Hammerness, K., Lankford, H., Loeb, S., Ronfeldt, M., & Wyckoff, J. (2012). Recruiting effective math teachers: evidence from New York City. *American Educational Research Journal*, *49*(6), 1008-1047.

Brill, S., & McCartney, A. (2008). Stopping the revolving door: increasing teacher retention. *Politics & Policy*, *36*(5), 750-744.

Brown, K., & Wynn, S. (2009). Finding, supporting, and keeping: the role of the principal in teacher retention issues. *Leadership & Policy in Schools*, *8*(1), 37-63. doi:10.1080/15700760701817371

Certo, J. L., & Fox, J. E. (2002). Retaining quality teachers. *The High school Journal*, *86*(1), 57-75.

Cochran-Smith, M. (2004). Stayers, leavers, lovers, and dreamers: insights about teacher retention. *Journal of Teacher Education*, *55*(5), 387-392.

Curtis, C. (2012). Why do they choose to teach - and why do they leave? A study of middle school and high school mathematics teachers. *Education*, *132*(4), 779-788.

Curtis, C., & Wise, D. (2012). Mathematics teachers speak out - why are we losing our new teachers? *National Teacher Education Journal*, *5*(2), 75-81.

David, J. L. (2008). What research says about... teacher recruitment incentives. *Educational Leadership*, *65*(7), 84-86.

Fisher, M. H. (2011). Factors influencing stress, burnout, and retention of secondary teachers. *Current Issues in Education*, *14*(1), 1-37.

Fulbeck, E. S. (2014). Teacher mobility and financial incentives: a descriptive analysis of Denver's ProComp. *Educational Evaluation and Policy Analysis*, *36*(1), 67-82.

Garcia, C., Slate, J. R., & Delgado, C. (2009). Salary and ranking and teacher turnover: a statewide study. *International Journal of Education Policy and Leadership*, *4*(7), 1-8 *Arts Education Policy Review*, *111: 112-121*. doi: 10.1080/10632910903458896

Gardner, R. D. (2010). Should I stay or should I go? Factors that influence the retention, turnover, and attrition of K–12 music teachers in the United States. *Arts Education Policy Review*, *111*(3), 112-121. doi:10.1080/10632910903458896

George, D., & Mallery, P. (2014). *IBM Statistics 21 Step by Step: A Simple Guide and Reference*. (13th ed.). New Jersey: Pearson Education.

Gonzalez, L., Brown, M., & Slate, J. R. (2008). Teachers who left the teaching profession: a qualitative understanding. *Qualitative Report*, *13*(1), 1-11.

Goodpaster, K. S., Adedokun, O. A., & Weaver, G. C. (2012). Teachers' perceptions of rural STEM teaching: implications for rural teacher retention. *Rural Educator*, *33*(3), 9-22.

Greenlee, B., & Brown, J. J. (2009). Retaining teachers in challenging schools. *Education*, *130*(1), 96-109.

Hair, J. F., Jr., Anderson, R. E., Tatham, R. L. & Black, W. C. (1995). *Multivariate Data Analysis* (3rd ed.). New York: Macmillan.

Hughes, G. D. (2012). Teacher retention: teacher characteristics, school characteristics, organizational characteristics, and teacher efficacy. *Journal of Educational Research*, *105*(4), 245-255. doi:10.1080/00220671.2011.584922

IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, *38*(3). 499-534.

Ingersoll, R. M., & Perda, D. (2010). Is the supply of mathematics and science teachers sufficient? *American Educational Research Journal*, *47*(3), 563-594.

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, *60*(8), 30-33.

Kaufman, M., & Al-Bataineh, A. (2011). Factors that influence teacher retention. *International Journal of the Humanities*, *9*(3), 251-264.

Kersaint, G., Lewis, J., Potter, R., & Meisels, G. (2007). Why teachers leave: factors that influence retention and resignation. *Teaching and Teacher Education: An International Journal of Research and Studies*, *23*(6), 775-794.

Leithwood, K., Patten, S., & Jantzi, D. (2010). Testing a conception of how school leadership influence student learning. *Education Administrative Quarterly*, *46*(5), 671-706.

Lopez, A. J. (2010). Reducing teacher turnover by utilizing a national list of reasons for teacher dissatisfaction or how to keep teachers from declaring "Dear folks, I quit". (Masters Thesis) Retrieved from ERIC.ed.gov (ED518123)

Luft, J. A., Wong, S. S., & Semken, S. (2011). Rethinking recruitment: the comprehensive and strategic recruitment of secondary science teachers. *Journal of Science Teacher Education, 22*(5), 459-474. doi:10.1007/s10972-011-9243-2

National Center for Education Statistics (2011). Teacher questionnaire, schools and staffing survey 2011-12 school year. Retrieved July 22, 2014, from http://nces.ed.gov/surveys/sass/

Sass, D. A., Flores, B., Claeys, L., & Perez, B. (2012). Identifying personal and contextual factors that contribute to attrition rates for Texas public school teachers. *Education Policy Analysis Archives, 20*(15), 1-30. doi: http://dxdoi.org/10.14507/epaa.v20n15.2012

Sedivy-Benton, A. L., & Boden McGill, C. J. (2012). Significant factors for teachers' intentions to stay or leave the profession: teacher influence on school, perception of control, and perceived support. *National Teacher Education Journal*, *5*(2), 99-114.

Shen, J. (2001). Teacher retention and attrition in public schools: evidence from SASS91. *Journal of Educational Research*, *91*(2), 81-88.

Tabachnick, B.G., Fidell, L. S. (2001). *Using Multivariate Statistics* (4th ed.). Boston, MA: Allyn and Bacon.

Tai, R. H., Liu, C., & Fan, X. (2007). Factors influencing retention of mathematics and science teachers in secondary schools--a study based on SASS/TFS. *Science Educator*, *16*(2), 27-32.

Tienken, C. H. (2013). Conclusions from PISA and TIMSS testing. *Kappa Delta Pi Record*, *49*(2), 56-58. doi:10.1080/00228958.2013.786588

Virginia Department of Education, Teaching in Virginia. (2012). *Highly qualified Teachers and Paraprofessionals.* Richmond VA: Virginia Department of Education. Retrieved August 14, 2014 from http://www.doe.virginia.gov/teaching/highly_qualified/index.shtml

United States Department of Education, Office of Post-Secondary Education. (2013). *Teacher Shortage Areas Nationwide Listing*. Retrieved August 14, 2014 from http://www2.ed.gov/about/offices/list/ope/pol/tsa.pdf

Appendix

APPENDIX A: Institutional Review Board Approval

LYNCHBURG COLLEGE EST. 1903

Lynchburg College Institutional Review Board for Human Subjects Research

Research Study Determination Letter

Date: April 8, 2015

To: Dr. Sally Selden and Mr. Scott Douglass

From: Dr. Sharon B. Foreman-Kready,

Director and Chair, Institutional Review Board (IRB)

Review Reference No.: LCHS1415117

LC IRB Approval No.: **LCHSA1415087**
Project Title: Factors Influencing Math and Science Teacher Intentions to Stay or Leave the Teaching Profession
Final Determination: Approved
Approval Date: April 8, 2015
Expiration Date: April 8, 2016

Thank you for your recent submission to the Lynchburg College Institutional Review Board (IRB) for Human Subjects Research. Your request for review of your research project listed above has been completed. The proposal and related study comply with the standards set by the U.S. Department of Health and Human Services, Code of Federal Regulations, Title 45 CFR Part 46, Protection of Human Subjects, and all applicable federal, state, and institutional policies. If a member of the research team is affiliated with and/or if there is an affiliated research site from which participants are recruited and/or data are gathered, then your study may necessitate review from another entity. It the responsibility of the PI to inquire at other site(s) and with other IRBs regarding reviewability and, if necessary, secure approval from other site(s)/IRB(s) prior to the collection of data.

Please remember that if any modifications are necessary, these changes need to be approved by this Board. The IRB website includes detailed instructions and forms for this process. Approval for this proposal is for **one year; the expiration date is listed above**. **Investigators must submit**

a closure form or a renewal request form to the IRB Director following the instructions provided on the IRB website* at least 30 days before the end date of the approval period as stated in the most recent approval letter for the study. While the LC IRB makes an effort to send reminder correspondence 60-90 days before the end of the approval period, it is ultimately the responsibility of the PI and research team, not the LC IRB, to ensure that this deadline is met. This deadline will allow adequate time for the IRB to review the form so that a decision can be made before the research proposal approval expires. Please feel free to contact me at irb-hs@lynchburg.edu if you have any questions.

*The Lynchburg College Institutional Review Board website is located at http://www.lynchburg.edu/institutional-review-boardirb-human-subjects-research; use menu on left of page to navigate to Submission Instructions and Forms page.

Lynchburg College Institutional Review Board (IRB) – IRB-HS@lynchburg.edu

APPENDIX B: Message to Administrators

Dear Administrator,

My name is Scott Douglass and I am conducting a study for my dissertation as a requirement for my Doctorate in Education at Lynchburg College. The purpose of my study is to investigate factors that influence math and science teacher intentions to leave or stay in the teaching profession. The IRB at Lynchburg College has already reviewed and approved the survey and there are no foreseeable risks of physical harm associated with participation in this research study.

The intent of this memo is to inform administrators that a survey will be electronically sent to secondary math and science teachers sometime in the next two weeks. This study includes ten high schools in a region in central Virginia and the results will be confidential. No individuals or schools will be identified in the study. I hope this study can provide important information to administrators about factors that have the greatest influence on math and science teacher intentions to leave or stay in the teaching profession. Thank you so much for your time and assistance in encouraging your secondary math and science teachers to participate in my study.

Sincerely,

Scott Douglass, M.Ed.

APPENDIX C: Informed Consent Agreement

Informed Consent Agreement

Please read this consent agreement carefully before you decide to participate in the research study.

Project Title: Factors Influencing Math and Science Teacher Intentions to Leave or Stay in the Teaching Profession

Purpose: The purpose of this research study is to understand the factors that influence math and science teacher intentions to remain in or leave the teaching profession.

Participation: You are being asked to participate in this study because you are either a math or science secondary teacher in this region of Central Virginia. This study will take place by electronic survey administration via SurveyMonkey. You will be asked to complete an electronic survey.

Time Required: Your participation is expected to take about 8-10 minutes.

Risks & Benefits: There are no foreseeable risks of physical harm associated with your participation in this research study. There does exist a slight possibility that a question could provoke a negative emotional response or reflection. It has been my intent to include only questions that would have minimal chance for provoking such a response. This study is expected to benefit you by providing information to administrators and policy makers regarding influential factors that impact secondary math or science teachers to remain or leave the teaching profession. In addition, the study may help administrators and policymakers determine how best utilize their limited resources to retain qualified math and science teachers. Student learning will benefit because when teachers are retained, there is a more stable school climate, which is more conducive to learning.

Compensation: You will receive no additional compensation for your participation; however, participants responding to the survey will be entered into a random prize drawing for a $50 Walmart gift card. The drawing will be held following the completion of the data collection portion of the research study. Your odds of winning would be approximately one out of 100. The winner's name will be kept confidential by the researcher.

Voluntary Participation: Please understand that participation is completely voluntary. You have the right to refuse to participate and/or answer any question(s) for any reason, without penalty. You also have the right to withdraw from the research study at any time without penalty. If you want to withdraw from the study simply exit the survey.

Confidentiality: Your individual privacy will be maintained throughout this study. In order to preserve the confidentiality of your responses, any personal identifying data, such as email addresses, will be removed from the data set. The electronic data file shall be maintained in an encrypted and password protected environment. Study results will be presented in such a manner as to maintain confidentiality of respondents. In no case will any results that could be identified with or attributed to a specific respondent be shared with anyone outside of the research team.

Whom to Contact with Questions: If you have any questions or would like additional information about this research, please contact Scott Douglass at 434-944-9599, sdouglass@cvgs.k12.va.us. You may also contact the faculty research sponsor, Dr. Sally Selden, Vice President and Dean for Academic Affairs at Lynchburg College: Selden@lynchburg.edu, 434-544-8266. The Lynchburg College Institutional Review Board (IRB) for Human Subjects Research has approved this project. This IRB currently does not stamp

approval on the informed consent/assent documents; however, an approval number is assigned to approved studies – the approval number for this study is LCHS1516031. You may contact the IRB Director and Chair, Dr. Sharon Foreman-Kready, through the Office of the Associate Dean for Academic Affairs at Lynchburg College at 434.544.8327 or irb-hs@lynchburg.edu with any questions or concerns related to this research study.

Agreement: I understand the above information and have had all of my questions about participation in this research study answered. By checking the below box, I voluntarily agree to participate in the research study described above and verify that I am 18 years of age or older.

Please indicate if you consent to participate in this study.

☐ Yes

☐ No

APPENDIX D: Survey Questions

Factors that Influence Math and Science Teacher Retention

1. Please indicate if you consent to participate in this study.

- Yes
- No

2. To what extent do you agree or disagree with the following statement? The school administration's behavior toward the teachers is supportive and encouraging.

- strongly agree
- somewhat agree
- somewhat disagree
- strongly disagree

3. To what extent do you agree or disagree with the following statement? Necessary materials such as textbooks, supplies, and copy machines are available as needed by the teachers.

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree

4. To what extent do you agree or disagree with the following statement? My principal enforces school rules for student conduct and backs me up when I need it.

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree

5. To what extent do you agree or disagree with the following statement? In this school, teachers are recognized for a job well done.

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree

6. To what extent do you agree or disagree with the following statement? I am given the support I need to teach students with special needs.

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree

7. To what extent do you agree or disagree with the following statement? The principal knows what kind of school he or she wants and has communicated it to the teachers.

- Strongly Agree
- Somewhat Agree
- Somewhat Disagree
- Strongly Disagree

8. How much actual influence do you think teachers have over school policy at this school in establishing curriculum?

- No influence
- Minor influence
- Moderate influence
- A great deal of influence

9. How much actual influence do you think teachers have over school policy at this school in determining the content of in-service professional development programs?

- No influence
- Minor influence
- Moderate influence
- A great deal of influence

10. How much actual control do you have in your classroom at this school over selecting textbooks and other instructional materials?

- No control
- Minor control
- Moderate control
- A great deal of control

11. How much actual control do you have in your classroom at this school over selecting content, topics, and skills to be taught?

- No control
- Minor control
- Moderate control
- A great deal of control

12. How much actual control do you have in your classroom at this school over selecting teaching techniques?

- No control
- Minor control
- Moderate control
- A great deal of control

13. How much actual control do you have in your classroom at this school over evaluating and grading students?

- No control
- Minor control
- Moderate control
- A great deal of control

14. How much actual control do you have in your classroom at this school over disciplining students?

- No control
- Minor control
- Moderate control
- A great deal of control

15. How much actual control do you have in your classroom at this school over determining the amount of homework to be assigned?

- No control
- Minor control
- Moderate control
- A great deal of control

16. To what extent do you agree or disagree with the following statement? I am satisfied with my teaching salary.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

17. To what extent do you agree or disagree with the following statement. The stress and disappointments involved in teaching at this school aren't really worth it.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

18. Including hours spent during the school day, before and after school, and on the weekends, how many hours do you spend on ALL teaching and other school-related activities during a typical FULL WEEK at this school?

19. Are student test score outcomes or test score growth included as an evaluation criterion in your formal evaluation this school year?

- Yes
- No

20. To what extent do you agree or disagree with the following statement? I worry about the security of my job because of the performance of my students or my school on state and/or local tests.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

21. To what extent do you agree or disagree with the following statement? I am generally satisfied with being a teacher at this school.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

22. To what extent do you agree or disagree with the following statement? The teachers at this school like being here; I would describe us as a satisfied group.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

23. To what extent do you agree or disagree with the following statement? I like the way things are run at this school.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

24. To what extent do you agree or disagree with the following statement? State or district content standards have had a positive influence on my satisfaction with teaching.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

25. To what extent do you agree or disagree with the following statement? I don't seem to have as much enthusiasm now as I did when I began teaching.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

26. To what extent do you agree or disagree with the following statement? If I could get a higher paying job I'd leave teaching as soon as possible.

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree

27. If you could go back to your college days and start over again, would you become a teacher or not?

- Certainly would become a teacher
- Probably would become a teacher
- Chance about even for and against
- Probably would not become a teacher
- Certainly would not become a teacher

28. How long do you plan to remain in teaching?

- As long as I am able
- Until I am eligible for retirement benefits from this job
- Until I am eligible for retirement benefits from a previous job
- Until I am eligible for Social Security benefits
- Until a specific life event occurs (e.g.. parenthood, marriage)
- Until a more desirable job opportunity comes along
- Definitely plan to leave as soon as I can
- Undecided at this time

29. This school year, what is your main teaching assignment field at this school?

- Math
- Science

Other (please specify)

30. Excluding time spent on maternity/paternity leave or sabbatical, how many school years have you worked as a teacher? (Include the current school year)

31. Which of the following describes the teaching certificate you currently hold that certifies you to teach in this State?

- Regular or standard state certificate or advanced professional certificate
- Certificate issued after satisfying all requirements except the completion of a probationary period
- Certificate the requires some additional coursework, student teaching, or passage of a test
- Certificate issued to person who must complete a certification program in order to continue teaching
- I do not hold any of the above certifications in this state

32. Are you male or female?

- Male
- Female

33. What is your year of birth?

34. Is there anything else you like to add?