LOTTERY TUITION ASSISTANCE AS A PREDICTOR OF RETENTION AT A PUBLIC TWO-YEAR COLLEGE

Joel Darby Welch
Clemson University

Follow this and additional works at: https://tigerprints.clemson.edu/all_dissertations
Part of the Educational Leadership Commons

Recommended Citation
Welch, Joel Darby, "LOTTERY TUITION ASSISTANCE AS A PREDICTOR OF RETENTION AT A PUBLIC TWO-YEAR COLLEGE" (2014). All Dissertations. 1404.
https://tigerprints.clemson.edu/all_dissertations/1404

This Dissertation is brought to you for free and open access by the Dissertations at TigerPrints. It has been accepted for inclusion in All Dissertations by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
LOTTERY TUITION ASSISTANCE AS A PREDICTOR OF RETENTION AT A PUBLIC TWO-YEAR COLLEGE

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Educational Leadership

by
Joel Darby Welch
May 2014

Accepted by:
Dr. Robert Knoeppe, Committee Chair
Dr. Tony W. Cawthon
Dr. Leslie Gonzales
Dr. Russell A. Marion, II
ABSTRACT

The purpose of this study was to examine the relationship between unmet financial need, lottery tuition assistance and retention. This study considered whether unmet financial need served as a predictor of retention and how the addition of lottery tuition assistance (LTA) to a financial aid package reduced unmet financial need. Retention was defined as a student who started in Fall, 2008 and returned in Fall, 2009. The two-year college, Greenville Technical College, considered in this study was a mid-size, public, two-year college in the southeastern United States.

A secondary data source was used in the study of first time students taking a minimum of six credit hours in the Fall, 2008 cohort. Path analysis techniques were used to evaluate a model of retention and analyze the relationship between lottery tuition assistance, unmet financial need and retention. Demographic, academic and financial variables were utilized in the study.

The model fit statistics indicated a plausible model for retention. Findings from the study showed that unmet financial need had a significant effect on retention. As unmet financial need increases, the probability that a student will be retained decreases. GPA had a significant effect on retention. As GPA increases the probability that a student will be retained increases. Lottery tuition assistance had an indirect effect on retention acting through GPA.

The secondary purpose of the study was to determine how the addition of LTA to the financial aid package reduced unmet financial need and the characteristics of students who received LTA. 35.7% of the cohort received lottery tuition assistance. A majority of
students who received LTA did not have unmet financial need and therefore had no
reduction in unmet financial need. An examination of students who received LTA
revealed that most of the students were White/non-Hispanics between the ages of 16 and
21. The conclusion is that a significant negative relationship exists between unmet
financial need and retention and that lottery tuition assistance reduces unmet financial
need for only 15% of the students in the cohort.
ACKNOWLEDGMENTS

I would have never been able to complete this journey without the total support of my wife, Lisa Welch. It was her encouragement and constant support that enabled me to keep moving forward. I have always been honored to call her my wife, best friend, and confidant. She always told me what I needed to hear and not what I wanted to hear and any measure of success that I have had in this endeavor belongs to her also.

To my parents, Reverend Darby and Jo Ann Welch, I sincerely appreciate their support. They have always given me unconditional love and taught me that I could accomplish anything. They gave me a foundation of discipline, integrity and tenacity that carried me through when I wanted to quit.

I am thankful to my committee chair, Dr. Robert Knoeppel. He was always encouraging and helped me see the path forward, even when I felt like there was no way. His interest in my research kept me excited about the project. I appreciate our many conversations and especially your questions about what does it mean or what about this perspective. I am grateful to my committee members, Dr. Tony Cawthon, Dr. Leslie Gonzales and Dr. Russell Marion, for their discussions and contributions to my research.

I offer a special thank you to my Greenville Technical College family, especially Mark Sejman, who assisted me with data collection and answered question after question about the data. Your encouragement and support helped me finish the project.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>iv</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>ix</td>
</tr>
<tr>
<td><strong>CHAPTER</strong></td>
<td></td>
</tr>
<tr>
<td>I. NATURE AND SCOPE OF THE STUDY</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>3</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>5</td>
</tr>
<tr>
<td>Research Questions</td>
<td>6</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>6</td>
</tr>
<tr>
<td>Research Methodology</td>
<td>10</td>
</tr>
<tr>
<td>Description of the Institution</td>
<td>10</td>
</tr>
<tr>
<td>Participants</td>
<td>11</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>12</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>13</td>
</tr>
<tr>
<td>Significance of Study</td>
<td>16</td>
</tr>
<tr>
<td>Delimitations</td>
<td>17</td>
</tr>
<tr>
<td>Organization of the Study</td>
<td>17</td>
</tr>
<tr>
<td>Summary</td>
<td>18</td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE</td>
<td>19</td>
</tr>
<tr>
<td>Introduction</td>
<td>19</td>
</tr>
<tr>
<td>Development of the Two-Year College</td>
<td>19</td>
</tr>
<tr>
<td>Development of South Carolina Technical Colleges</td>
<td>21</td>
</tr>
<tr>
<td>National Profile of the Two-Year College Student</td>
<td>22</td>
</tr>
<tr>
<td>Retention Theories</td>
<td>23</td>
</tr>
<tr>
<td>Tinto’s Student Integration Theory</td>
<td>24</td>
</tr>
<tr>
<td>Bean’s Student Attrition Theory</td>
<td>27</td>
</tr>
<tr>
<td>Other Retention Theories</td>
<td>30</td>
</tr>
<tr>
<td>Comparison Between Models</td>
<td>32</td>
</tr>
</tbody>
</table>
# Table of Contents (Continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retention Studies of Two-Year College Students</td>
<td>34</td>
</tr>
<tr>
<td>Variables that Influence Student Retention Rates</td>
<td>35</td>
</tr>
<tr>
<td>Student Characteristics</td>
<td>37</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>39</td>
</tr>
<tr>
<td>Pell Grant</td>
<td>40</td>
</tr>
<tr>
<td>Student Loans</td>
<td>42</td>
</tr>
<tr>
<td>Merit Based Aid</td>
<td>44</td>
</tr>
<tr>
<td>South Carolina Lottery Tuition Assistance</td>
<td>44</td>
</tr>
<tr>
<td>Financial Assistance and Retention</td>
<td>48</td>
</tr>
<tr>
<td>Summary</td>
<td>50</td>
</tr>
</tbody>
</table>

## III. RESEARCH DESIGN

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>52</td>
</tr>
<tr>
<td>Research Design</td>
<td>52</td>
</tr>
<tr>
<td>Path Analysis</td>
<td>54</td>
</tr>
<tr>
<td>Path and Structural Models Used to Study Retention</td>
<td>56</td>
</tr>
<tr>
<td>Methodology</td>
<td>67</td>
</tr>
<tr>
<td>Variables</td>
<td>68</td>
</tr>
<tr>
<td>Research Hypothesis</td>
<td>72</td>
</tr>
<tr>
<td>Institution</td>
<td>72</td>
</tr>
<tr>
<td>Cohort</td>
<td>73</td>
</tr>
<tr>
<td>Data Used in the Study</td>
<td>73</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>74</td>
</tr>
<tr>
<td>Summary of Procedures</td>
<td>76</td>
</tr>
</tbody>
</table>

## IV. PRESENTATION OF FINDINGS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>77</td>
</tr>
<tr>
<td>Cohort Descriptive Statistics</td>
<td>78</td>
</tr>
<tr>
<td>Age Distribution</td>
<td>78</td>
</tr>
<tr>
<td>Gender Distribution</td>
<td>79</td>
</tr>
<tr>
<td>Ethnicity Distribution</td>
<td>79</td>
</tr>
<tr>
<td>Financial Aid Distribution</td>
<td>80</td>
</tr>
<tr>
<td>Ability to pay Distribution</td>
<td>81</td>
</tr>
<tr>
<td>Unmet Financial Need Distribution</td>
<td>81</td>
</tr>
<tr>
<td>Academic Preparation Distribution</td>
<td>82</td>
</tr>
<tr>
<td>College GPA Distribution</td>
<td>83</td>
</tr>
<tr>
<td>Summary of Descriptive Statistics</td>
<td>84</td>
</tr>
<tr>
<td>Data Screening</td>
<td>86</td>
</tr>
<tr>
<td>Analysis of a Priori Model</td>
<td>89</td>
</tr>
<tr>
<td>Post-hoc Analysis</td>
<td>90</td>
</tr>
</tbody>
</table>
Table of Contents (Continued)  

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lottery Tuition Assistance</td>
<td>97</td>
</tr>
<tr>
<td>Lottery Tuition Assistance Descriptive Statistics</td>
<td>97</td>
</tr>
<tr>
<td>Summary</td>
<td>98</td>
</tr>
</tbody>
</table>

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS .................................. 100  

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>100</td>
</tr>
<tr>
<td>Summary of Findings</td>
<td>100</td>
</tr>
<tr>
<td>Conclusions</td>
<td>102</td>
</tr>
<tr>
<td>Limitations</td>
<td>104</td>
</tr>
<tr>
<td>Implications and Recommendations for Future Research</td>
<td>104</td>
</tr>
<tr>
<td>Recommendations for Future Research</td>
<td>107</td>
</tr>
<tr>
<td>Conclusion</td>
<td>108</td>
</tr>
</tbody>
</table>

REFERENCES ........................................................................................................... 109
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>2</td>
<td>Gender Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>3</td>
<td>Ethnicity Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>4</td>
<td>Financial Aid Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>5</td>
<td>Ability to Pay Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>6</td>
<td>Unmet Financial Need Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>7</td>
<td>Academic Preparation Distribution and Retention Rate of Participants</td>
</tr>
<tr>
<td>8</td>
<td>GPA Distribution and Retention Rate of the Participants</td>
</tr>
<tr>
<td>9</td>
<td>Raw Data Descriptive Statistics for Variables</td>
</tr>
<tr>
<td>10</td>
<td>Descriptive Statistics for Transformed Variables</td>
</tr>
<tr>
<td>11</td>
<td>Model Fit Statistics for Modifications Adding Paths to a Priori Model</td>
</tr>
<tr>
<td>12</td>
<td>Model Fit Statistics for Modifications Removing Paths</td>
</tr>
<tr>
<td>13</td>
<td>Unstandardized Direct and Indirect Effects on Retention</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Conceptual Model of Retention</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Demographic, Academic and Financial Impacts on Retention</td>
<td>53</td>
</tr>
<tr>
<td>3</td>
<td>A 10-Variable Causal Model of the Attrition Process</td>
<td>57</td>
</tr>
<tr>
<td>4</td>
<td>A Conceptual Model of Dropout Syndrome</td>
<td>58</td>
</tr>
<tr>
<td>5</td>
<td>A Conceptual Model of Nontraditional Student Attrition</td>
<td>59</td>
</tr>
<tr>
<td>6</td>
<td>Structural Equation Model of Chicano College Student Retention</td>
<td>60</td>
</tr>
<tr>
<td>7</td>
<td>Structural Equation Model of Aid Programs</td>
<td>61</td>
</tr>
<tr>
<td>8</td>
<td>Effects of Ability to Pay on College Persistence</td>
<td>62</td>
</tr>
<tr>
<td>9</td>
<td>A Structural Model of the Role of Finances in the Persistence Process</td>
<td>64</td>
</tr>
<tr>
<td>10</td>
<td>Hypothetical Model</td>
<td>65</td>
</tr>
<tr>
<td>11</td>
<td>Hypothesized Model of Pre-matriculation Attitudes to College Student Attrition</td>
<td>66</td>
</tr>
<tr>
<td>12</td>
<td>Final Path Model for Retention</td>
<td>94</td>
</tr>
</tbody>
</table>
CHAPTER ONE

NATURE AND SCOPE OF THE STUDY

Introduction

Retention and the factors that impact retention are important to two-year colleges due to the increased focus on performance based funding and the College Completion Agenda (American Association of Community Colleges, 2011; College Board Advocacy & Policy Center, 2013; Humphreys, 2012). The College Completion Agenda is a broad-based movement designed to significantly increase the number of American citizens holding post-secondary degrees. Retention is a measure used in performance based funding and must be improved to meet the College Completion Agenda. Two-year colleges are looking for ways to improve the percentage of students that are retained (American Association of Community Colleges, 2011; College Board Advocacy & Policy Center, 2013; Humphreys, 2012; Roman, 2007; Tinto, 2006-2007; Wild & Ebbers, 2002). Research has shown that there are many factors that impact retention including student demographic characteristics, student academic characteristics, financial characteristics, and institutional characteristics (Borglum & Kubala, 2000; Cofer & Somers, 2001; Feldman, 1993; Fike & Fike, 2008; Napoli & Wortman, 1998). This study examines lottery tuition assistance as a predictor of retention utilizing a path analysis to examine the effects of student demographic, academic and financial characteristics.

Over the past 30 years, financial aid to students has changed from a prevalence of grant aid to a prevalence of loans (Berkner, 2000; Chen & DesJardins, 2008; Dowd & Coury, 2006). At the same time that loans were growing in their importance to the
financial aid package, higher education institutions increased their tuition and fees at rates higher than inflation. As the costs to attend higher education have increased, the importance of financial aid has also increased (Heller, 1999; Hippensteel, St. John, & Starkey, 1996; St. John & Starkey, 1995). The increased financial burden on students, has led many states to implement lotteries to offset higher education costs. The criteria used to provide the lottery revenues to institutions and students have varied, but funds were usually allocated based on need or merit (Ellis, 2007; North American Association of State and Provincial Lotteries, 2011; Young, 2004).

Research has consistently shown that there is a relationship between retention and financial aid. Studies have shown that the type of financial aid, whether grants, loans, merit aid or need-based aid differentially impacts retention. When researchers accounted for the different types of aid, student demographics and academic characteristics, there appeared to emerge a pattern in students’ willingness to utilize financial aid (Chen & DesJardins, 2008; Chen & DesJardins, 2010; Dowd A. C., 2004; Dowd & Coury, 2006; Kim, 2007; St. John & Starkey, 1995).

In 2002, South Carolina implemented a unique Lottery Tuition Assistance (LTA) program that was the focus of this study. LTA was established solely for two-year colleges as a grant program designed to reduce the cost of attendance at two-year colleges (Rutherford, 2008; South Carolina Education Lottery, 2011). Lottery Tuition Assistance was a grant form of financial aid that was provided to students to off-set the cost of tuition and was neither merit nor need-based. It was available to students who are South Carolina residents, and it was applied after federal grant aid. The effects of this form of
financial aid have not been studied in-depth. There is a gap in knowledge of the effects of LTA on retention at two-year colleges. This study utilized a path analysis to examine lottery tuition assistance as a predictor of retention at Greenville Technical College, a public two-year college in South Carolina, United States.

Statement of the Problem

During the past two decades, while college costs were increasing, state and federal agencies became more focused on performance measures for two-year colleges (American Association of Community Colleges, 2011; Freedman, 2006; Mcleod, 2011; Roman, 2007; Tinto, 2006-2007; Tollefson, 2009; Zarkesh & Beas, 2004). Tennessee was the first state to implement a formal performance based funding formula, but since that time more than 30 states have either implemented or proposed a performance based funding formula. Initially, performance based funding utilized measures related to completion and job placement; however, measures related to in-process success such as passing gatekeeper courses and first year retention are being used in newer proposals (McLendon & Hearn, 2013).

Another focus on defining higher education success has become a broad-based movement called the Completion Agenda. In 2009, President Obama launched the Completion Agenda and the Department of Education, various state agencies, corporate foundations and education policy organizations led the movement. The Completion Agenda movement proposed to significantly increase the number of completers at colleges and universities (American Association of Community Colleges, 2011; College Board Advocacy & Policy Center, 2013; Humphreys, 2012). The Completion Agenda
and performance based funding compelled higher education institutions to consider policies that improve retention (American Association of Community Colleges, 2011; Heller, 2003; Tinto, 2006-2007; Wild & Ebbers, 2002).

While the focus on retention increased, states decreased funding for two-year colleges (Dowd & Shieh, 2013; Lyall & Sell, 2006). Decreases in state funding led to increases in tuition and fees and the cost of attending two-year colleges increased at a faster pace than inflation resulting in a net-cost increase in the cost of attendance (Pope, 2006; University Business, 2006). Research consistently found that students respond negatively to increases in the net-cost of education and that retention was negatively correlated to increases in net-cost. Net-cost was a function of the cost of attendance and financial aid. Financial aid reduced the net-cost of college (Cofer & Somers, 2001; Heller, 1999; Hippensteel, St. John, & Starkey, 1996; Paulsen & St. John, 2002; St. John & Starkey, 1995). Through the years, financial aid fundamentally changed as students became more reliant on loans to fund their education instead of grants. LTA was implemented as a unique form of state grant aid that was intended to reduce the net cost of attending a two-year college in South Carolina (Rutherford, 2008; South Carolina Education Lottery, 2013).

Net cost, as a result of total cost of attendance minus financial aid, allowed researchers to examine the impacts of unmet financial need. Unmet financial need was the total of a student’s expected family contribution minus the net cost of attendance (Cunningham, 2005; Long, 2008; Long, 2007; Rendon, Dowd, & Nora, 2012; Titus, 2006). Lottery tuition assistance has not been studied as a form of financial aid that
reduces the unmet financial need of students. While financial aid and net cost as predictors of retention have been extensively studied, the relationship between unmet need and retention has not been included as a variable in many studies. There has been little research into the relationship between unmet financial need and retention. No studies were found that examined lottery tuition and unmet financial need as predictors of retention.

**Purpose of the Study**

The purpose of this study was to examine the relationship between unmet financial need and lottery tuition assistance (LTA) to retention. This study considered whether unmet financial need served as a predictor of retention and how the addition of Lottery Tuition Assistance to a financial aid package reduced unmet financial need. The two-year college, Greenville Technical College, considered in this study was a mid-size, public, two-year college in the southeastern United States. The study utilized a path analysis to analyze the relationships between demographic, academic and financial variables to retention. The financial variables considered were:

1. Need Based Grants (Federal Pell Grant and South Carolina Need based Grants)
2. Loans (Federal Subsidized and Un-Subsidized Loans)
3. The Legislative Incentive for Future Excellence (LIFE) Scholarship
4. Lottery Tuition Assistance (LTA)
5. Unmet Financial Need
6. Expected Family Contribution (EFC)
The demographic variables considered were:

1. Gender
2. Ethnicity
3. Age

The academic variables considered were:

1. GPA
2. Developmental Classes
3. Major
4. Academic Goals (No Degree, Certificate/Diploma, Associate Degree or Transfer)
5. Academic Level (Certificate, Diploma or Associate Degree)
6. Credit Hours

**Research Questions**

The following three research questions guided the research for the study.

1. Is unmet financial need a predictor of retention?
2. How does the addition of lottery tuition assistance to a financial aid package reduce the unmet financial need?
3. What are the characteristics of students who receive lottery tuition assistance?

**Definitions of Terms**

The terms used in this study were defined as:
Associate Degree: A degree program requiring a minimum of 60 credit hours and approved by The State Board for Technical and Comprehensive Education (The State Board for Technical and Comprehensive Education, 2009).

Cohort: First time, associate degree seeking students starting Greenville Technical College in Fall, 2008.

College Completion Agenda: Broad based movement to significantly increase the number of citizens holding post-secondary degrees (American Association of Community Colleges, 2011; College Board Advocacy & Policy Center, 2013; Humphreys, 2012; Office of the President of the United States, 2013).

Developmental Courses: Courses structured for students who score below the program entrance requirements on the college placement test (Greenville Technical College, 2013).

Expected Family Contribution (EFC): “The Expected Family Contribution (EFC) is a measure of your family’s financial strength and is calculated according to a formula established by law” (Federal Student Aid Information Center, 2013).

Full-Time Student: A student taking a minimum of 12 credit hours (Greenville Technical College, 2013).

Goal: The academic goal of a student identified during the admission process as no degree, certificate, diploma, associate degree or transfer to a four-year college.

Grade Point Average (GPA): A student’s grade point average is calculated using an average of grades from each curriculum course. The GPA is based on a four point
scale where an A is equal to 4 quality points; a B is equal to 3 quality points, etc (Greenville Technical College, 2013).

**Greenville Technical College:** A public two-year college located in the western portion of South Carolina, United States. The college offers more than 100 programs of study (Greenville Technical College, 2013).

**Legislative Incentive for Future Excellence (LIFE) Scholarship:** The LIFE Scholarship as applied at two-year South Carolina colleges is a merit award requiring a 3.0 GPA. It pays the cost of tuition, plus a $300 annual book allowance up to a maximum of $2,500 each semester (Greenville Technical College, 2013).

**Level:** A variable utilized to indicate the academic level of the program a student participated in. It is defined as either a certificate, diploma or associate degree.

**Lottery Tuition Assistance:** The South Carolina Lottery Tuition Assistance (LTA) program is a grant award that is subject to change each year. The grant is applied after other forms of grant aid and only applies to tuition and fees. Students may not receive LTA funds that exceed the uncovered portion of their tuition and fees. Students must meet the eligibility requirements established by South Carolina to include; be a South Carolina resident, complete a Free Application for Federal Student Aid, be admitted to a certificate, diploma or associate degree program, and be enrolled in a minimum of 6 credit hours in an eligible program. LTA is a form of grant aid that the student does not have to repay (Greenville Technical College, 2013).

**Merit Based Aid:** Aid that is awarded based on qualifications of the student. The qualifications of the student may include academic, artistic, athletic, civic engagement,
social responsibility, leadership or other qualifications established by the college (The Princeton Review, 2014).

*Need Based Aid:* Aid that is awarded based on the financial need of the student (The Princeton Review, 2014).

*Open Access:* An open-access institution accepts all students who apply (Cohen & Brawer, 2003).

*Part-Time Student:* A student taking less than 12 credit hours (Greenville Technical College, 2013).

*Pell Grant:* A federal grant that is determined by family income and size. Eligibility is determined based on information submitted on the Free Application for Federal Student Aid (Greenville Technical College, 2013).

*Retention:* A student who attended in Fall, 2008 and attended classes in Fall, 2009 (Dowd & Coury, 2006).

*SC Need Based-Grant:* The South Carolina Need-Based Grant is awarded based on financial need and availability of funds at the college. This is state grant aid that does not have to be repaid by the student (Greenville Technical College, 2013).

*Subsidized Loan:* A loan made as part of the Federal Stafford Direct Student Loan Program where the interest is deferred until the students graduates or drops out. Students must repay all funds received as part of a subsidized loan (Greenville Technical College, 2013).

*Two-year college:* A college whose highest degree is an associate degree. Two-year colleges are also called junior colleges, community colleges, comprehensive
community colleges, and technical colleges (Carnegie Foundation, 2014; Cohen & Brawer, 2003).

*Un-Subsidized Loan:* A loan made as part of the Federal Stafford Direct Student Loan Program which accrues interest upon receipt by the student. Students must repay all funds received as part of an un-subsidized loan (Greenville Technical College, 2013).

**Research Methodology**

This study was a descriptive, predictive study utilizing Mplus version 7.11 to analyze a conceptual path model to determine the relationship between lottery tuition assistance, unmet financial need and retention. I used a secondary data source to analyze a Fall, 2008 cohort of first time students taking at least six credit hours at Greenville Technical College, a public, two-year college in the southeastern United States. Path analysis techniques were used to test an a priori model of retention. Model fit was evaluated using model fit statistics. A post hoc analysis was performed and analyzed to determine additional paths that should be added or initial paths that should be removed from the model. Path analysis techniques were used because they examine interactions between variables by simultaneous regressing endogenous variables on exogenous variables resulting in path coefficients that indicate relationships between the exogenous variables and endogenous variables (Braunstein, McGrath, & Pescatrice, 2000-2001; Hoffman & Lowitzki, 2005).

**Description of the Institution**

According to the *Greenville Technical College 2013 Catalog*, Greenville Technical College was one of the largest public two-year colleges in South Carolina
serving primarily the residents of Greenville County. Due to its open access policy, the college served students from a wide range of socioeconomic and educational backgrounds. The college offered more than 100 programs of study. The programs consisted of certificates, diplomas and associate degrees that prepared students to enter the workforce or transfer to a four-year college or university. The college offered an extensive array of developmental courses to assist underprepared student to meet their educational goals. The college stated its mission as “Greenville Technical College drives personal and economic growth through learning” (Greenville Technical College, 2013, p. 8).

Enrollment data from the 2013 Greenville Technical College Fact Book indicated that the college served 14,414 credit students and more than 23,000 continuing education students during the 2008-2009 academic year. The enrollment distribution during the 2008-2009 academic year was 66.9% White/non-Hispanic, 24.2% Black/African-American, 4.0% Hispanic and 4.8% other (Greenville Technical College, 2013). According to the CHE website, 43.5% of the students were full-time and 60% were female (SC Commission on Higher Education, 2009).

**Participants**

The study utilized a secondary data source to examine the retention of first-time students (n=3,328) taking at least six credit hours at Greenville Technical College in Fall, 2008. The first time students in the Fall, 2008 cohort had a retention rate of 45.6%. The enrollment distribution of the cohort was 62.6% White/non-Hispanic, 28.2% Black/African-American, 4.0% Hispanic and 5.2% other/unknown. The cohort was
55.4% female and 44.6% male. Full time students made up 70.9% of the cohort. Of the 3,328 students in the cohort, 35.7% received lottery tuition assistance and 15.6% received no aid.

Conceptual Framework

The conceptual a priori model is displayed in Figure 1. The purpose of this study was to determine if lottery tuition assistance and unmet financial need were predictors of retention and how adding lottery tuition assistance to a financial aid package reduced unmet financial need. The study also examined the characteristics of students who received lottery tuition assistance.

![Conceptual Model of Retention](image)

*Figure 1 Conceptual Model of Retention*

The endogenous variable, retention, refers to whether first time students, taking at least six credit hours, who started in Fall, 2008 were retained or not-retained in Fall,
2009. The exogenous financial variables included (a) need based grants, (b) loans, (c) LIFE Scholarship, (d) lottery tuition assistance and (e) expected family contribution. The endogenous financial variable was unmet financial need. The exogenous academic variables were (a) academic goal, (b) academic level, (c) major, (e) developmental classes and (f) credit hours. The endogenous academic variable was college grade point average. The exogenous demographic variables of (a) gender, (b) ethnicity and (c) age were included. The endogenous outcome variable was a dichotomous variable, retention. Path analysis techniques were utilized to determine the effects of the exogenous variables on the endogenous variables. The study was limited by variables available in the secondary data source.

**Theoretical Framework**

The five primary theoretical perspectives on retention are psychological, economic, societal/cultural, organizational and interactional (Braxton, Vesper, & Hossler, 1995; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Tinto, 1986). Of these five perspectives, Tinto’s Student Integration Theory and Bean’s Student Attrition Model became the prominent theories used in retention research (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castaneda, 1993; Herzog, 2005; Hossler, 1984; Kahn & Nauta, 2001; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Morrison & Silverman, 2012). Tinto’s theory was founded in an interactional framework and related the dropout decision to how student characteristics such as past educational experiences and goal commitment interacted with the college environment academically and socially (Tinto, 1975). Tinto acknowledged the impact of cost-benefit analysis on students, but he did not
address the impacts of financial aid or the financial situation of the family on retention in his research. Tinto believed that the elements that predict retention are complicated, and a researcher must make difficult decisions about what elements to examine in a research study and recommended that more research be conducted examining the cost-benefit analysis and the impact of financial aid (Tinto, 1982).

Bean’s Student Attrition Theory was founded in organizational and psychological perspectives (Chen & DesJardins, 2010; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006) and took into account the background characteristics of students (Fike & Fike, 2008). Bean’s research examined the relationship between the student and the institution through a set of intervening variables that included satisfaction and institutional commitment. The variables were organizational determinants and background characteristics (Bean, 1980). As Bean researched the interactions, he found that students’ belief in their fit to the institution was reduced by a lack of finances. He found that finances had a negative influence on dropout (Bean, 1985; Eaton & Bean, 1995).

Tinto and Bean’s models were complementary models as both models relied on a fit between the institution and student to predict retention and the fit was impacted by a student’s cost benefit analysis (Cabrera, Nora, & Castaneda, 1993; Cabrera, Castaneda, Nora, & Hengstler, 1992; Hossler, 1984). St. John and Starkey (1995) argue from economic theory that students consider the type of aid in their cost benefit analysis, and research has shown the importance of the type of financial aid as an element impacting retention within Tinto and Bean’s frameworks (Chen & DesJardins, 2008; Cofer & Somers, 2001; Dowd & Coury, 2006; Heller, The Effects of Tuition and State Financial
Researchers have used a cultural theoretical lens to challenge Tinto and Bean’s theories due to underlying culturally biased assumptions about social and academic integration when applied to underrepresented groups. The theories did not account for the cultural, societal and historical forces or the environment these forces created for underrepresented groups. Much of the research related to Tinto and Bean’s theories have tested the theories without addressing the culturally biased assumptions inherent in the theories (Dowd, Sawatzky, & Korn, 2011; Gonzalez, 2000-2001; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Museus & Quaye, 2009; Rendon, Jalomo, & Nora, 2000). To address the assumptions inherent in the model, Rendon, Jalomo and Nora (2000) proposed that cultural perspectives of underrepresented groups should be considered in research.

The five primary theoretical perspectives provided a foundation for research into retention, but each perspective had weaknesses. External factors are minimized in the psychological perspective and interactional perspectives minimized economic factors. The organizational perspective minimized why students are not retained and economic perspectives minimized academic/social factors. Societal/cultural perspectives did not provide a comprehensive model to explain retention (Chen & DesJardins, 2010). The retention process was complicated and a single theoretical perspective did not account for all of the variables that influence retention (Bean, 1982; Hossler, 1984; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Tinto, 1982).
This study utilized economic and interactional perspectives to examine the relationship between lottery tuition assistance, unmet financial need and retention. The researcher utilized these perspectives because lottery tuition assistance has not been examined in conjunction with unmet financial need. Before utilizing cultural or psychological perspectives to examine lottery tuition, the researcher desired to determine if lottery tuition assistance served as a predictor of retention. The economic and interactional perspective allowed the researcher to determine the significance of lottery tuition in a conceptual model. Future research would examine the significance of lottery tuition from a more comprehensive theoretical lens. The researcher utilized a priori model to examine lottery tuition assistance and unmet financial need as predictors of retention.

**Significance of Study**

Lottery Tuition Assistance was a unique form of financial aid that had not been examined in-depth. It was not merit or need-based and was not guaranteed year to year (Rutherford, 2008; South Carolina Education Lottery, 2013; South Carolina Technical College System, 2010). Due to the uniqueness of LTA and lack of examination of the relationship between LTA and retention, this study could affect policy relating to financial aid to students. The interaction between financial aid, student demographics and academics is not a simple model (Heller, 1997). This study adds to the body of knowledge on the complex relationship between financial aid and retention at a public two-year college. The results of the study could affect how two-year colleges in South Carolina promote access to LTA funds to influence retention decisions of students.
Delimitations

This study had several delimitations. As a descriptive predictive study utilizing path analysis techniques to analyze a priori model, the results cannot be generalized to all two-year colleges or to higher education as a whole. The study was delimited to the two-year college in South Carolina utilized for the study. The study examined the relationship between lottery tuition assistant, unmet financial need and retention, but it did not include input from the students on why they were not retained. The study was limited to the variables included in the research. There may be other attributes of first-year students taking at least six credit hours that were not examined during this study.

Organization of the Study

Research has consistently demonstrated the importance of financial aid to retention and different forms of financial aid should be examined to consider their relationship to retention (Heller, 2003). The first chapter introduces the problem of retention and the importance of financial aid to the student’s decision to return. The purpose of the study, three research questions, definitions for terms, research methodology, description of participants and the institution, theoretical framework and the significance are presented in the first chapter.

In the second chapter, the major theories of retention are presented and related to two-year colleges specifically. The chapter also presents research related to financial assistance and retention. Student attributes that interact with the retention decision are presented. The third chapter presents the research methodology utilized in the study of...
the 2008 cohort of first-time students taking at least six credit hours at Greenville Technical College.

The fourth chapter includes an analysis of the research findings and displays the conceptual path model. The fifth chapter presents the results of the study and includes significant findings along with conclusions, limitations and recommendations for future studies.

Summary

The primary purpose of this study was to investigate the relationship between lottery tuition assistance, unmet financial need and retention and whether adding lottery tuition assistance to a financial aid package reduced unmet financial need. The study also examined the characteristics of students who received lottery tuition assistance. A secondary data source consisting of first-time students taking at least six credit hours who started Greenville Technical College in Fall, 2008 was examined to evaluate the relationship between their lottery tuition assistance, unmet financial need and retention.

This study may inform policy makers as they make decisions on how to provide financial assistance to students. It may assist administrators as they design strategies to meet the Completion Agenda and meet the requirements of performance based funding.
CHAPTER TWO
REVIEW OF THE LITERATURE

Introduction

This study examined the relationship between lottery tuition, unmet financial need and retention, specifically whether the addition of the Lottery Tuition Assistance to a financial aid package in South Carolina reduced a student’s unmet financial need and served as a predictor of retention at a public two-year college. Chapter 2 explores the literature related to retention and focuses on the impacts of financial challenges faced by two-year college students. The literature review examines the development of two-year colleges, the profile of two-year college students, retention theories, financial assistance and the relationship between financial assistance and retention.

Development of the Two-Year College

Two-year colleges have a long and rich history. The literature was not definitive on the first two-year college, but Joliet Junior College was recognized as the longest continually operating two-year college in the United States. The literature was definitive on the first state legislation authorizing two-year colleges. It was adopted by the state legislature in California in 1907, but the legislation was vetoed by the governor (Phillippe & Gonzalez-Sullivan, 2005; Tollefson, 2009). Even though it was not passed, the law illustrated one of the primary methods that would drive two-year college development during the early 20th century. Secondary schools were authorized to extend upward and offer college courses to prepare students for transfer. Hence, two-year colleges were called Junior Colleges (Bragg, 2001; Cohen & Brawer, 2003; Phillippe & Gonzalez-
Sullivan, 2005). The other method that triggered two-year college development was universities developing junior colleges to take the pressure off of having to serve first and second year students (Bragg, 2001).

During the 1950’s and 1960’s, the focus shifted to vocational education. After World War II, the Truman Commission Report recommended that junior colleges begin to offer vocational education to improve access. The Truman Commission used the term Two-year College and “…provided an early vision of the comprehensive mission that permeates the US system of community college today” (Bragg, 2001, p. 99). The diversified approach to two-year college development led to significant differences in how two-year colleges were governed and funded in various states depending upon the era in which they were started.

Two-year colleges would develop with different missions across the United States. The various missions were reflected in the different names of the colleges and systems in different states. Two-year colleges were called Junior Colleges during the early to mid-1900’s. During the 1970’s, the primary name became Community Colleges. From the 1960’s until present, several other names have been used such as Technical Colleges, Community and Technical Colleges, City College, County College, and Technical Institutes, etc. (Cohen & Brawer, 2003). The various names of the two-year colleges reflect their local characteristics and guide their missions: whether to prepare students for transfer to universities, support economic development, teach vocational skills or some combination of these (Cohen & Brawer, 2003). This diversity in primary mission has been reflected in funding sources.
As the two-year colleges developed in a variety of ways, their funding sources evolved through the years. Two-year colleges received funding from four primary sources: (a) student tuition and fees, (b) local taxes, (c) state revenues, and (d) federal allocations. Through the years, the primary funding sources shifted from primarily student tuition and fees to local taxes, to state revenues and back again depending on the state where the two-year college was located (Cohen & Brawer, 2003). Only within the last 50 years has federal funding become a significant contributor for two-year colleges growing from 0% of total operating budgets in 1930 to 8% in 2007 (Tollefson, 2009). California was the first state to authorize funding for two-year colleges in 1917. As states and local communities chartered and funded two-year colleges they spread across the country.

From the early 1900’s until the 1940’s, the number of two-year colleges grew to more than 225. Two-year colleges continued to grow through the 1960’s when a rapid expansion began (Bean & Metzner, 1985; Phillippe & Gonzalez-Sullivan, 2005). Four hundred and ninety seven two-year colleges were added during the 1960’s to bring the total of two-year colleges to 909 (Phillippe & Gonzalez-Sullivan, 2005). Today, there are more than 1,175 two-year colleges serving 11.7 million students and almost every American has a two-year college within an hour’s drive of their home (American Association of Community Colleges, 2009; Phillippe & Gonzalez-Sullivan, 2005).

**Development of South Carolina Technical Colleges**

Although two-year colleges have a long and rich history, South Carolina did not establish a two-year college until 1962. South Carolina’s Technical Educational Centers
(would become the Technical Colleges in 1972) were developed with the same goals of providing access and ensuring that 95% of South Carolina residents were within five miles of a Technical Education Center. The legislation authorizing the Technical Education Centers was passed in the early 1960’s and was influenced by the vocational emphasis of the time. The first Technical Educational Center was established in Greenville, SC in 1962. This initial legislation governed how the technical colleges would be funded. The state supported the operating budget and local funds provided the funding for grounds and maintenance. By 1973, all 16 of the technical colleges were in operation. Up until 1972, the Technical Education Centers were completely focused on vocational education. Legislation passed in 1972, expanded the role to include the first two years of college and the name of the Technical Educational Centers was changed to Technical Colleges (Duffy, 1997).

**National Profile of the Two-Year College student**

There was not a typical two-year college student (Center for Community College Engagement, 2009; Miller, Pope, & Steinmann, 2005). The profile of the two-year college student has been as diverse as the various missions of the two-year colleges. The average age of the two-year college student was 29 and 40% of the student population was between 22 and 39 (American Association of Community Colleges, 2009). Phillippe and Gonzalez-Sullivan noted that “The reasons for choosing to attend these community colleges are as diverse as the students themselves: ease of access, low cost, excellent academic program…” (2005, p. 19). Many of the students already had degrees and many of the students were first generation college students (Phillippe & Gonzalez-Sullivan,
First generation students made up 39% of the students at two-year colleges (American Association of Community Colleges, 2009). Two-year colleges had to be prepared to serve students who were underprepared, burdened with family responsibilities and working more than 30 hours per week (Fike & Fike, 2008; Herzog, 2005; Phillippe & Gonzalez-Sullivan, 2005).

The profile of two-year college students was changing, but remained different from university students. More underrepresented groups including Native Americans, Blacks and Hispanics attended two-year colleges than universities (Fike & Fike, 2008). The percentage of enrollment at two-year colleges of students over 40 has declined while the percentage of traditional aged students has increased. Twenty percent of two-year college students intended to transfer to a four-year college or university. A majority of two-year college students worked between 11 and 35 hours per week and many full time students worked close to 40 hours per week (Caporrimo, 2008; Center for Community College Engagement, 2009; Fike & Fike, 2008; Miller, Pope, & Steinmann, 2005). These students took many of their classes in the evening or online. Sixty percent of the students had a goal of completing an associate degree, and 51% of the students planned to transfer to a university. A majority of students cited lack of finances as the issue that would cause them to withdraw from class or from the college (Center for Community College Engagement, 2009).

**Retention Theories**

There has been much research into why students leave college. Researchers have approached retention studies from five different theoretical perspectives: (a)
psychological, (b) economic, (c) societal/cultural, (d) organizational, and (e) sociological/interactional (Braxton, Vesper, & Hossler, 1995; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Tinto, 1986). The research had coalesced around two theories: (a) Tinto’s Student Integration Model and (b) Bean’s Student Attrition Model (Cabrera, Castaneda, Nora, & Hengstler, 1992; Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Herzog, 2005; Hossler, 1984; Kahn & Nauta, 2001; Thomas, 2000; Museus & Maramba, 2011; Museus & Quaye, 2009; Thomas, 2000). Another theory that researchers tested was Astin’s Student Involvement Theory (Astin, 1999; Fike & Fike, 2008; Wild & Ebbers, 2002). Why students leave college was a complicated issue, and each researcher must establish limits to their theories (Bean, 1982; Hossler, 1984).

**Tinto’s Student Integration Theory**

Tinto used a synthesis of research in 1975 to formulate a theoretical model on student dropout. His Student Integration Model was founded in a sociological/interactional framework and attempted to link student and institutional characteristics to the decision to leave an institution (Cabrera, Castaneda, Nora, & Hengstler, 1992; Chen & DesJardins, 2008; Herzog, 2005; Hossler, 1984; Kahn & Nauta, 2001; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Tinto, 1975). He defined the decision to leave the institution by whether it was a voluntary withdrawal or an academic failure. He believed that the research to this point had not given enough attention to the differences in the decision to leave an institution based on voluntary withdrawal or academic failure. Tinto developed the theoretical model based upon research by Spady and Durkheim’s theory of suicide. He also used cost-benefit analysis from the field of
economics to support his theory. Based upon the research up to that time, Tinto proposed that the decision to drop out of the institution was related to the interaction of student characteristics and institutional characteristics (Fike & Fike, 2008; Tinto, 1975). Tinto stated “Given individual characteristics, prior experiences, and commitments, the model argues that it is the individual’s integration into the academic and social systems of the college that most directly relates to his continuance in that college” (1975, p. 96).

From the research, Tinto determined that family background, individual characteristics, past educational experiences and goal commitment were related to the drop out decision. The dropout decision was related to how these student characteristics interacted with the college environment academically and socially. The institutional characteristics included institutional type, college quality, student composition, and size. From this interaction, Tinto theorized that voluntary dropout was related more to a mismatch between the individual and the institutional characteristics while “grade performance is the single strongest predictor of academic dismissal” (1975, p. 117).

In 1982, Tinto refined his theory by publishing some limits of the theory. Tinto did not address the impacts of financial aid or the financial situation of the family in the theory. Tinto proposed that the elements that predict retention are so complicated that a researcher must make difficult choices about what should be explained in a study. Tinto stated “Attempts to greatly increase a model’s explanation of variance – for instance, through the inclusion of large numbers of variables [1] – often result in comparable loss in clarity of explanation” (1982, p. 688). The model was not developed to explain every variation of retention, but that had not stopped researchers from working to understand
the process better. Tinto’s theory acknowledged the impact of cost-benefit analysis by students, but more research was needed in this area (Tinto, 1982).

Students used cost-benefit analysis to make their decision about dropping out. The students’ decision to not return was not purely a financial decision, but it reflected the students’ integration into the social and academic fabric of the college. The institutional characteristics impacted how students evaluated the cost benefit relationship. Dropout was higher in the first year, because students had not invested much in the institution yet. As students stayed at the institution for longer periods of time, they became invested in the education and the rate of dropout declined (Pascarella & Terenzini, 1980; Tinto, 1982).

While Tinto’s theory had achieved preeminent status, empirical support had been mixed (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). Several studies utilized a cultural perspective and provided a critique of Tinto’s theory as it related to underrepresented groups and non-traditional aged students in college (Museus & Quaye, 2009; Rendon, Jalomo, & Nora, 2000). Tinto (2006-2007) acknowledged that the initial assumptions in his theory should be reviewed and tested, specifically the social and academic integration constructs and how they related to underrepresented groups and non-traditional aged students.

The initial research into retention was viewed through the lens of psychology and students who were not retained were considered to be at fault. Colleges and universities moved into an era of involvement and developed programs to integrate students into the dominant culture of the institution. This line of research did not consider the unique
needs of underrepresented groups and non-traditional students. The research that tested Tinto’s theory in the early stages studied students who were mostly white, traditional aged students from middle to upper class families at universities. The research adhered to a premise of acculturation/assimilation for underrepresented students to be successful. Failure of underrepresented students was assigned to individuals and not institutional actions (Rendon, Jalomo, & Nora, 2000).

An underlying assumption of Tinto’s theory was that the factors that supported the academic and social integration constructs were the same for all students. The social and academic integration constructs did not account for differences in how underrepresented groups may react to the campus culture. They did not account for extra work that underrepresented students have to do to adjust to a different dominant culture on campus. It was assumed that students had to find a place on campus to fit in and did not account for support communities on and off–campus that could support a student’s culture and support the student’s success. The recent research testing Tinto’s theory indicated that researchers should account for differences across ethnic groups including attitudes toward financial aid, social support structures and academic success (Dowd, Sawatzky, & Korn, 2011; Gonzalez, 2000-2001; Museus & Quaye, 2009; Rendon, Jalomo, & Nora, 2000).

**Bean’s Student Attrition Theory**

While Tinto founded his theory of student attrition on Durkheim’s theory of suicide, Bean based his student attrition theory on work by Price related to studies of turn-over in work organizations (Bean, 1980; Bean, 1981). Bean did not rely on simple
correlations between dropout and student or institutional characteristics, but he used multiple regression and path analysis methodology (Bean, 1980; Bean, 1981; Bean, 1982; Bean, 1985). Bean’s work was based on studies of turn-over in work organizations (Bean, 1980; Hossler, 1984; Kahn & Nauta, 2001). Bean desired to develop a causal model of student attrition and his causal model contained four categories of variables: (a) dependent variable, dropout; (b) the intervening variables, satisfaction and institutional commitment; (c) the organizational determinants; and (d) the background variables (Bean, 1980).

Bean’s research was consistent with Tinto and Spady, and Bean took into account the background characteristics of students (Fike & Fike, 2008). Bean’s initial research was limited to traditional students with the following characteristics: (a) age under 22 years; (b) caucasian; (c) U.S. citizenship; and (d) single. Bean (1980) found that students’ institutional commitment was the most significant intervening variable for both women and men, but that men and women drop-out for different reasons. Interactions with campus organizations were more important for women and resulted in higher retention. Men were more influenced to drop out when the system seemed too rigid or they felt that they were not developing personal, intellectual, creative or interpersonal skills. The only significant background variable for both men and women was past academic performance. Students with lower high school grade point averages had lower retention. It was also important to note that the perceived quality of the education was important to students and impacted their decision to dropout (Bean, 1980).
Bean (1985) further refined his theory to examine “why certain variables affect attrition” (Bean, 1982, p. 35). Bean theorized that reasons for dropout syndrome were different depending on how long the student had attended the college. The longer a student stayed then the more the student was socialized to the institution and the stronger the students’ belief that they fit the institution. The socialization and belief strengthened their desire to complete. The development of socialization and belief in fit to the institutions were impacted by the student’s grades and grades at college were impacted by pre-matriculation academic performance. A students’ belief in their fit to the institution was reduced by a lack of finances, perceived opportunity to transfer, and wanting to be with a significant other (Bean, 1985; Eaton & Bean, 1995). Bean (1985) found that the factors affecting juniors were slightly different than freshmen and sophomores. The primary difference was related to socialization/selection factors. “The influence of institutional fit on dropout syndrome decreases significantly over time. If students are not selected or socialized to the values of the institution early they are likely to drop out” (Bean, 1985, p. 53). Bean (1985) found in this study that lack of finances had a negative relationship to dropout.

Bean (1982; 1985; Fike & Fike, 2008) theorized that the student, institutional and financial factors support a consideration of intent to leave. Intent to leave had a strong relationship with attitudes, intentions and behaviors. These characteristics are important to understanding dropout syndrome.
Other Retention Theories

Astin (1993; Fike & Fike, 2008; Wild & Ebbers, 2002) proposed an Input-Environment-Outcome Model. He argued that the inputs the student brings to the college are important in predicting retention (Astin, 1997). Astin (1993; 1999) further developed a Student Involvement Theory. Astin theorized that all significant factors in student retention could be related to student involvement. He proposed that this is one of the reasons that retention rates are higher at universities than two-year colleges. Student involvement related to “the quantity and quality of the physical and psychological energy that students invest in the college experience” (Astin, 1999, p. 528). Student involvement formed the environment in the Input-Environment-Outcome Model (Kelly, 1996).

Kahn and Nauta (2001) applied Social Cognitive Career Theory to student persistence. They did not discount previous research that showed the importance of academic ability or past performance, but they argued that Social Cognitive Career Theory helped us understand student persistence. The Social Cognitive Career Theory suggested that a students’ persistence was affected by the students’ belief about their academic ability, the consequences of persisting and the determination to persist. Kahn and Nauta (2001) defined these as self-efficacy, outcome expectations and performance goals. Utilizing hierarchical logistic regression, Kahn and Nauta (2001) found that assessment of social-cognitive variables prior to college did not add to the prediction of persistence. However, assessments during the student’s second year added significantly to the prediction of freshman-to-sophomore persistence. The results emphasized the importance of assessments close to the decision by the student to persist or withdraw.
Friedman and Mandel (2010) applied expectancy theory and goal-setting theory to student persistence. Friedman and Mandel utilized ANOVA and multiple regression to study freshman entering a state college in northern New York. Their results indicated that traditional variables such as SAT scores and high school grades predicted retention. The results for expectancy theory and goal-setting theory were mixed. GPA was predicted by academic expectancy, but goal setting theory was not significant in predicting the outcomes.

Researchers have used an economic theoretical perspective to develop models of retention and test theoretical frameworks that included financial variables. St. John theorized that retention was “a function of social background, high school experience, aspirations, ability/achievement, college experience and student financial aid” (1990, p. 390). St. John and Starkey (1995) argued that the type of aid was a factor in how students developed their cost benefit analysis. Most of the research studies applied the economic perspective to Tinto’s theory and considered how financial attitudes, financial aid, ability to pay and unmet financial need supported or detracted from social and academic integration. The support for social and academic integration constructs was weak while the support for a positive relationship between financial aid and retention was strong (Cabrera, Nora, & Castaneda, 1993; Cabrera, Stampen, & Hansen, 1990; Chen & DesJardins, 2008).

Tinto’s Student Integration Theory and Bean’s Student Attrition Model are the preeminent theories on student retention (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castaneda, 1993; Herzog, 2005; Hossler, 1984; Kahn & Nauta, 2001).
but Tinto’s and Bean’s theories are part of five theoretical perspectives including psychological, economic, societal/cultural, organizational and interactional. While Tinto’s and Bean’s theories have received the most attention, other researchers have approached retention from other theoretical perspectives (Chen & DesJardins, 2008; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006). Chen and DesJardins (2010; 2008) argued that the theoretical perspectives were complimentary and each had weaknesses. The psychological perspective minimized external factors and interactional perspectives minimized economic factors. Organizational perspectives minimized why students leave and economic perspectives minimized academic and social factors. Societal/cultural perspectives did not provide a comprehensive model of retention. Chen and DesJardins (2010) supported using an integrated theoretical model to examine retention.

**Comparison between Models**

Research has shown that student retention is a complicated subject that has been approached from different perspectives (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castaneda, 1993; Herzog, 2005; Hossler, 1984). Tinto’s Student Integration Model and Bean’s Student Attrition Model have become the prominent theories of student retention (Cabrera, Castaneda, Nora, & Hengstler, 1992; Herzog, 2005; Hossler, 1984; Kahn & Nauta, 2001). Both models relied upon a fit between the institution and the student to predict retention (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castaneda, 1993; Hossler, 1984). The models used student surveys to determine institutional fit and GPA to measure academic performance (Herzog, 2005). The Student Integration Model and Student Attrition Model were each
developed using full time students from middle to upper class families, who were white males living in residence halls in university settings (Bean, 1980; 1981; Fike & Fike, 2008; Herzog, 2005; Tinto, 1982).

Each model emphasized different factors as the most important determinant of retention. The Student Integration Model emphasized academic integration and institutional fit while the Student Attrition Model emphasizes intent to persist, academic integration and external factors (Cabrera, Castaneda, Nora, & Hengstler, 1992; Cabrera, Nora, & Castaneda, 1993). Braxton, Brier and Hossler (1988, p. 242) stated retention studies “share some common characteristics. They employed longitudinal designs and attempted to identify causal relationships among variables by studying the interaction between students and the institutional environment.”

Quantitative and qualitative research studies have supported some of the factors and interrelationships in Tinto’s theory; however, the underlying assumptions demonstrate weaknesses when applied to underrepresented groups or non-traditional aged students. The interaction between students and the institutional environment including academic and financial factors were different for underrepresented groups and majority groups on campus. Researchers recommended that the preeminent theories on student retention should be tested to determine how they accounted for these differences adequately (Dowd, Sawatzky, & Korn, 2011; Gonzalez, 2000-2001; Museus & Quaye, 2009; Rendon, Jalomo, & Nora, 2000).
Retention Studies of Two-Year College Students

Tinto (1982) and Bean (1980) used four-year colleges and universities for the initial development and testing of their models of student persistence. The research testing Tinto, Bean and Astin’s models have used primarily four-year colleges and traditional college students (Bers & Smith, 1991; Borglum & Kubala, 2000; Feldman, 1993; Fike & Fike, 2008; Kienzl, Alfonso, & Melguizo, 2007; Nora, 1987; Strauss & Volkwein, 2004; Wild & Ebbers, 2002). Cohen and Brawer (2003) stated that two-year college students were not the same as four-year college students, and that they had different characteristics (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Pascarella & Terenzini, 2005). Researchers attempted to determine the applicability of Tinto, Bean and Astin’s theories to two-year colleges and to determine what the differences were in how background characteristics, institutional factors, and student engagement affected two-year college students differently than four-year college students (Feldman, 1993; Fike & Fike, 2008; Kienzl, Alfonso, & Melguizo, 2007; Napoli & Wortman, 1998). The research resulted in mixed results regarding applicability of models and variables (Bers & Smith, 1991; Napoli & Wortman, 1998).

Tinto’s model of Social Integration and Academic Integration was supported by research conducted by Bers and Smith (1991), and Napoli and Wortman (1998). While Bers and Smith (1991) supported Tinto’s model, they found more support for the influence of educational objectives, intent to reenroll, pre-college characteristics and employment status. Kienzl, Alfonso and Melguizo (2007) supported the influence of educational objectives. Nora’s (1987) research found minimal impact of Social
Integration or Academic Integration, but Nora did find that institutional and goal commitment were significantly related to retention. Borglum and Kubala (2000) generally supported Nora’s findings.

Napoli and Wortman (1998) tested the applicability of Tinto’s model to two-year college students. They found that Tinto’s model can be applied to two-year college students. Social integration and academic integration were related to retention. Negative events at the two-year college and adverse external demands on the student had significant impacts on the students’ decision to return to college. The higher dropout rate of two-year college students when compared to four-year college students implied that two-year college students faced an additional strain of not only adjusting to academic demands but the external demands of their lives. The researchers used different definitions of variables and different methods of model development for testing in each of the studies.

**Variables that Influence Student Retention Rates**

Much of the research into the variables that impacted retention utilized samples of traditional aged, white, middle class to upper class students living in residence halls at universities (Rendon, Jalomo, & Nora, 2000). Separate studies were needed that focused on the variables applicable to two-year college students so Fike and Fike (2008) conducted a study that focused on the unique characteristics of two-year college students.

“These variables include age, because community colleges enroll large numbers of adult and returning students; ethnicity, because the community college is the primary entry point to higher education for minorities; enrollment in
developmental education, because a high proportion of students entering through the open door are not college ready; and the number of hours for which student enroll, because nearly two thirds of two-year college students attend on a part-time basis (Powers, 2007) and because students can enter a two-year college to take classes for the purpose of obtaining a 2-year transferable degree or a terminal certificate, enhancing general job skills, or for personal enrichment (Derby & Smith, 2004)” (Fike & Fike, 2008, pp. 70-71).

Because the results of research into factors affecting persistence of two-year college students were mixed (Bers & Smith, 1991; Napoli & Wortman, 1998), the factors affecting two-year college students were not as well understood as four-year college and university students (Feldman, 1993). The student body at two-year colleges was heterogeneous (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Bers & Smith, 1991; Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008), and there was a large amount of heterogeneity in institutions (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006). The location and size of institutions had been found to impact retention of students. Bailey, Calcagno, Jenkins, Leinbach and Kienzl (2006) found that two-year colleges in urban areas had a lower completion rate than suburban and rural colleges and larger institutions had a lower completion rate. The authors noted that previous research on size of institutions had been inconclusive. Napoli and Wortman (1998) found that larger campuses had an indirect impact on persistence through social integration. The heterogeneity of students and institutions led to multiple definitions of key terms and a mixture of variables chosen for analysis (Wild & Ebbers, 2002).
Student Characteristics

Retention studies generally used a longitudinal model to consider term to term retention (Napoli & Wortman, 1998), fall to spring retention (Bers & Smith, 1991; Cofer & Somers, 2001), fall to fall retention (Feldman, 1993), graduation rate (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Jacoby, 2006; Kienzl, Alfonso, & Melguizo, 2007) or some combination of these (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Fike & Fike, 2008). When considering characteristics of students, researchers used age, gender, racial group, high school GPA, dependent status, socio-economic status, full-time/part-time status, employment, financial aid, and college GPA.

The significance of the student characteristics was mixed. Fike and Fike (2008) found that neither age, gender nor ethnicity were significant predictors of retention after controlling for covariates. Cofer and Somers (2001) found a positive relationship between retention and students over 30 years old. Feldman (1993) supported Cofer and Somers with a finding that younger students were more likely to drop out. Strauss and Volkwein (2004) found that age was significant with older students having a higher institutional commitment score. Feldman (1993) found that males had a lower rate of retention, while Bailey, Calcagno, Jenkins, Leinbach and Kienzl (2006) found that institutions with a larger percentage of women had a lower retention rate, but it should be noted that the authors cited several research studies that show women graduated at higher rates than men. Fike and Fike’s (2008) finding in this study was surprising and their research was not supported by others who found that underrepresented students were retained at lower
rates than whites (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Cofer & Somers, 2001; Feldman, 1993; Jacoby, 2006).

Borglum and Kubala (2000) and Feldman (1993) found that background academic skills as expressed through high school GPA were significantly related to retention. Nora (1987) found a minimal impact of high school GPA on retention of students. Feldman (1993) did not find a significant relationship between basic skill need and retention. Fike and Fike (2008) found that students who entered a two-year college needing a remedial math or reading course and completed it successfully had a higher retention rate than those that did not. Fike and Fike’s finding of successful completion of a developmental course positively impacting retention is in agreement with a study by Napoli and Wortman (1998) that found that positive academic experiences improved retention.

Part-time status has been negatively associated with persistence (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Cofer & Somers, 2001; Feldman, 1993). Feldman (1993) found that full-time employment was negatively associated with persistence. Two-year college students faced more external demands from family and work and must balance work, family and college (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Bers & Smith, 1991; Borglum & Kubala, 2000; Napoli & Wortman, 1998). External demands were negatively associated with retention. Another factor at two-year colleges that has been negatively associated with retention was the percentage of part-time faculty (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Jacoby, 2006).
Financial Assistance

Public funding of higher education institutions started with church institutions. The early institutions were low tuition and had small budgets. They accepted payment in many forms including produce, land and currency (Cohen A. M., 1998). Two-year colleges had not developed during this time. In 1862, the Morrill Act was passed and began an era of direct appropriations to public institutions. The purpose of the act was to provide support for at least one higher education institution in every state. The late 1800’s were an era of direct appropriations to public institutions. In the early 1900’s the federal government became a larger contributor of funds to higher education institutions (Cohen A. M., 1998; Cohen & Brawer, 2003), however, prior to 1940 two-year colleges were funded primarily through local sources and mostly by tuition and fees (Cohen & Brawer, 2003; Pedersen, 2005). Starting with the Servicemen’s Readjustment Act (GI Bill), the federal government began a switch from direct aid to institutions to indirect assistance to institutions through the GI Bill. The federal government’s indirect support of institutions led to systems of higher education developing differently across the country and funding streams varied between tuition, local taxes, state revenues and federal assistance (Cohen A. M., 1998; Cohen & Brawer, 2003; Waller, Glasscock, Glasscock, & Fulton-Calkins, 2006). While the higher education institutions were developing differently, the lasting legacy of the GI Bill would involve students. “The lasting legacy of the GI Bill, though, was to provide educational benefits directly to students without regard to gender, ethnicity, creed or religion” (Cofer & Somers, 2001, p. 56).
The next major effect on the development of two-year colleges would be the passage of The Higher Education Act of 1965. This act provided a compromise between direct aid to institutions and indirect aid to institutions through financial aid to students. The law was amended through the years including 1972 and 1992. The Higher Education Act and Amendments offered aid to students in a match to state aid. By 1999 state funding of direct aid had became a major source of providing public money to institutions. The Higher Education Act and Amendments created the Educational Opportunity Grant (EOG), Guaranteed Student Loan Program (GSL), and the Basic Educational Opportunity Grant (BEOG) which is also called the Pell Grant (Alexander, 2002; Cofer & Somers, 2001). These different forms of aid and other forms of aid such as subsidized and un-subsidized loans, tuition remission and work study wages demonstrate that financial assistance is not a simple model, but that it has different combinations depending on the higher education system (Heller, 1997).

**Pell Grant**

Kennamer, Katsinas, Hardy and Roessler (2010, p. 8) citing the Center for Higher Education Support Services stated “For more than 40 years, the Pell Grant Program, and its precursors, the Educational Opportunity Grant Program and Basic Educational Opportunity Act, have provided financial assistance and increased opportunities to the poor and middle class.” The program had bipartisan support and continued to grow (Baime & Mullin, 2010; Hartle, 2010). The Federal grant program for students began with the passage of the Higher Education Act of 1965. It established the Educational Opportunity Grant (EDG). The Higher Education Amendments of 1972 renamed the
EDG as the Supplemental Educational Opportunity Grant (SEOG) because it would supplement a new grant called the Basic Educational Opportunity Grant (BEOG). The Higher Education Amendments of 1972 also made another major change by allowing students to take their eligibility report to any institution. The change allowing students to take their eligibility report to any institution made the grant system portable. The 1972 Amendments strengthened the partnership between the Federal Government and State Governments through the State Student Incentive Grant (SSIG) program. SSIG provided matching funds from the federal government for need-based grant programs provided by state governments (Cofer & Somers, 2001; Heller, 2003; Washington Consulting Group, Inc., 1988). The federal matching funds led to an increase of state grant programs from 19 states with a grant program in 1969 to every state having a grant program by 1979 (Alexander, 2002; Heller, 2003).

After the 1972 Amendments, the grant assistance programs were established and amendments passed in 1976 reauthorized all existing programs. As a response to rising educational costs, Congress passed the Student Assistance Act of 1978. The Student Assistance Act of 1978 expanded the student eligibility of BEOG. The Educational Amendments of 1980 increased the aggregate amounts for some aid programs and renamed the BEOG in honor of Claiborne Pell. The BEOG has been called the Pell Grant since 1980. Congress continued tweaking the grant program by requiring males to complete Selective Service Registration to receive financial aid. Technical Amendments in 1982, 1983 and 1984 established annual Pell Grant cost of attendance and award
maximums. Major changes in the law since 1984 have focused on the loan programs

The Pell Grant was a significant program with a budget that exceeded eight
cabinet agencies, and it was the single largest program in the Department of Health and
Human Services, Education and Labor (Hartle, 2010). The Department of Education
projected that 44% of college students received Pell Grant awards in 2010-2011 (Baime
& Mullin, 2010; Hartle, 2010) and approximately one third of them were two-year
college students (Baime & Mullin, 2010). The number of students receiving a Pell Grant
increased and was expected to continue increasing (Baime & Mullin, 2010; Hartle, 2010).
The Pell Grant award was important to two-year college students due to the number of
lower income students (independent and dependent) attending two-year colleges. Almost
40% of dependent students with family incomes less than $36,000 attended two-year
colleges and 71% of Pell Grant Awards were given to dependent students with family
incomes of less than $30,000. Two-year college students have increased their share of
Pell Grant funds from 18.7% in 1986-87 to 30.1% of the total amount awarded in 2008-
2009. The Pell Grant covered a greater percentage of the cost of attending a two-year
college compared to a four year college or university and therefore can reduce a two-year
college student’s reliance on loans (Baime & Mullin, 2010).

Student Loans

The Guaranteed Student Loan (GSL) program was established by The Higher
Education Act of 1965 under the National Defense Student Loan (NDSL) program that
had been established as part of the National Defense Education Act of 1958. GSL was
extended by the Higher Education Amendments of 1972. The 1972 Amendments renamed the NDSL program as the National Direct Student Loan program. As tuition and educational costs rose, Congress responded by passing the Middle Income Student Assistance Act (MISAA) of 1978. A major change under MISAA that removed the GSL income ceiling led to an increase in the use of guaranteed loans compared to grant aid by students to fund their education (Chen & DesJardins, 2008). In the Educational Amendments of 1980, the Parent Loans for Undergraduate Students (PLUS) was established with no income restrictions. Significant changes were made to the loan programs in the Consolidated Omnibus Reconciliation Act of 1985. Eligibility for GSL undergraduate students had to be determined prior to receipt of funds and GLS, and PLUS funds had to be disbursed through multiple payments.

Another change in 1986 was to authorize loan consolidation. The GSL program was changed again in 1986 when financial restrictions were reinstated and required a needs assessment for students with family incomes above $30,000. Technical Amendments in 1987 renamed NDSL the Perkins Loan Program in honor of Carl Perkins who had been the chairman of the House Education and Labor Committee. The Technical Amendments added two new loan programs: (a) Supplemental Loans for Students (SLS) and (b) Income Contingent Loan (ICL). ICL was pilot tested and in 1994 the SLS was repealed. In 1988, GSL was renamed the Stafford Loan Program (Alexander, 2002; Cofer & Somers, 2001; Washington Consulting Group, Inc., 1988).

After 1988, new laws and regulations did little to change the structure of federal direct aid to students. The maximum amount for existing loan programs was increased,
and a federal unsubsidized Stafford Loan program was established. The changes in maximum amounts and changes in qualifications have led to more borrowing for students instead of grants (Berkner, 2000; Dowd & Coury, 2006).

**Merit Based Aid**

Merit based aid has become a large percentage of the aid awarded during the past 15 years (Heller, 2003; Ness, 2010). Heller (2003, p. 24) stated “In 1992, less than 10 percent of all state grant dollars awarded to undergraduates was provided without consideration of financial need; by the 2001-2002 academic year, this proportion reached 25 percent.” Georgia kicked off the trend in 1993 by utilizing lottery funds to provide merit aid. Merit based aid was not considered to increase access for students since it benefited students who already were most likely to attend college. There were different forms of merit aid in different states and the qualifications for the merit aid varied from state to state (Heller, 2003; Ness, 2010).

**South Carolina Lottery Tuition Assistance**

The history of Lotteries can be traced back into ancient times. In early American history, they were used for various purposes such as funding colleges, schools and churches. Harvard, Yale and Princeton among others received funding from lotteries (North American Association of State and Provincial Lotteries, 2011; Young, 2004). Lottery activity declined after the Civil War with the federal government banning lotteries and many states passing state laws banning lotteries. The situation regarding lotteries changed in 1964 when New Hampshire became the first state to adopt a lottery and earmark the proceeds for education. New York followed in 1967 and by 1999, 37
states and the District of Columbia operated lotteries. By 2004, this number increased to 40 and by 2007, 42 states had introduced lotteries. Of these 42 states, all but three linked the funds to education in some manner either through earmarks or through the general fund (Ellis, 2007; North American Association of State and Provincial Lotteries, 2011; Young, 2004).

South Carolina implemented a lottery on January 7, 2002 (South Carolina Education Lottery, 2011). South Carolina modeled its lottery on the Georgia lottery which was considered the most effective at school improvement and had been emulated by several states (Buchanan, 2007; Young, 2004). The South Carolina Education Lottery (SCEL) was established to support education including higher education and secondary education (South Carolina Education Lottery, 2011; Young, 2004). Through 2010-2011, SCEL had provided more than $2.5 billion to education in South Carolina. K-12 received 24%, while 74% was designated for higher education programs. Two percent was designated for other community education programs (South Carolina Education Lottery, 2011). The higher education programs provided funds through scholarships and grants, endowed chairs, technology and other higher education programs (South Carolina Education Lottery, 2013).

The scholarships and grants were used to provide funds to students. The scholarship programs included (a) Palmetto Fellows, (b) LIFE, (c) Enhancements, and (d) S. C. HOPE. The grant programs included (a) need-based grants, (b) lottery tuition assistance, and (c) National Guard College Assistance Program. Of these programs, only LIFE, need-based grant, lottery tuition assistance (LTA) and National Guard College
The LIFE scholarship is a academic merit award. Students must earn a minimum GPA of 3.0 at the end of their high school year based on the South Carolina uniform grading policy. Students must be U. S. citizens or lawful permanent residents and be a S. C. resident for tuition and fee purposes at the time of high school graduation and initial college enrollment. The LIFE scholarship paid up to $4,700 of tuition and provided $300 for books each academic year not to exceed the cost of attendance at public two-year colleges. Students had to complete 30 credit hours each year and maintain a college GPA of 3.0 to retain the LIFE scholarship. The total award was not allowed to exceed $5,000 (South Carolina Education Lottery, 2013).

The Need-based Grant and National Guard College Assistance Program were programs designated for specific populations. The Need-based Grant required that a student complete the FAFSA and be determined to be a “needy” student. Students are required to earn a minimum 2.0 college GPA and complete 24 credit hours as a full time student or 12 credit hours as a part-time student each academic year to maintain eligibility. The National Guard College Assistance Program required that a student be a member of the S. C. National Guard in good standing and remain so through the entire academic year (South Carolina Education Lottery, 2013).

Lottery Tuition Assistance (LTA) was a tuition grant program. Per state law, it was applied after other forms of federal and state grants. Students were required to complete FAFSA and enroll in at least six credit hours as a degree-seeking student to be
eligible. Students had to be eligible for in-state tuition rates and be U.S. Citizens or legal permanent residents to receive LTA. Students were not allowed to be eligible for the LIFE scholarship. To retain LTA in successive academic years, students had to maintain a 2.0 college GPA while attempting 24 credit hours. These requirements made LTA a unique program that applied for students of all ages attending public two-year college in South Carolina. LTA did not require a “needs” or “merit” test. All students who met the residence requirements and took a minimum of 6 credit hours qualified (South Carolina Education Lottery, 2013; South Carolina Technical College System, 2010; Rutherford, 2008).

Another unique aspect of LTA was that the award was determined every year by the legislature based upon the appropriation by the general assembly and the anticipated number of students who will apply. The amount of LTA available to students varied term to term (South Carolina Education Lottery, 2013; South Carolina Technical College System, 2010). The annual appropriations increased from $34 million in 2002-2003 to $47 million in 2010-2011 (South Carolina Budget and Control Board, 2011; South Carolina Commission on Higher Education, 2009).

In 2002-2003 approximately 28,000 individual awards were given. The number of students served continued to grow. By 2008-2009 approximately 40,000 students were receiving the award and more than 175,000 students had utilized LTA to help pay their college costs. The amount of LTA varied: $876 in 2003, $912 in 2007, and $900 in 2009 for students taking a full time load of 12 credit hours. Students taking between 6 and 12 credit hours received a pro-rated amount based on the number of credit hours that they
were taking (Rutherford, 2008; South Carolina Technical College System, 2007; Williams, 2003; York Technical College, 2009).

**Financial Assistance and Retention**

The relationship between financial assistance and retention has been of interest to researchers for many years and much research has been conducted on the relationship between direct student aid and retention. Researchers found that two-year college students’ retention was impacted by net tuition costs and net tuition costs were a function of financial aid packages (Cofer & Somers, 2001; Heller, 1999; Hippensteel, St. John, & Starkey, 1996; Paulsen & St. John, 2002; St. John & Starkey, 1995). The net tuition costs were determined by the actual tuition costs combined with the aid package. The aid package was made up of loans, work study and grants. The type of financial aid was important and the makeup of the package had an impact on retention and persistence to degree attainment (Chen & DesJardins, 2008; Chen & DesJardins, 2010; Dowd A. C., 2004; Dowd & Coury, 2006; Kim, 2007; St. John & Starkey, 1995).

The interaction of the financial aid package and net tuition cost was not clear. Some research has shown that loans increased retention and/or degree attainment (Chen & DesJardins, 2008; Cofer & Somers, 2001; Dowd A. C., 2004), while other research showed that a reliance on loans decreased degree attainment (Paulsen & St. John, 2002; St. John & Starkey, 1995). The different findings related to the impacts of loans on retention indicated that the relationship between loans, net cost, and retention were not well understood. Dowd and Coury (2006) found that loans increased retention fall to fall, but they did not have a significant impact on degree attainment. They found that no form
of financial aid had a significant impact on degree attainment. Others (Dowd & Coury, 2006; Paulsen & St. John, 2002; St. John & Starkey, 1995) found that an interaction between parental income or underrepresented group status and loans reduces retention. Underrepresented groups were less likely to utilize loans to finance their education. Additional research showed that as the debt load from loans increased retention was reduced and high debt load in the first year decreased the probability of degree attainment (Cofer & Somers, 2001; Dowd & Coury, 2006; Kim, 2007).

While the research on loans’ impact on retention and degree attainment has been mixed, the research on grant aid in the form of Pell Grants or state grants has been fairly consistent. Grant aid increased the probability of retention (Cofer & Somers, 2001; Dowd A. C., 2004; Fenske, Porter, & DuBrock, 2000; Heller, 2003). Paulsen and St. John (2002) reached a different conclusion in their research. They found that for the poor, grants and loans were negatively associated with persistence and for middle and upper income students, grants and loans had no impact on persistence. Paulsen and St. John (2002) indicated the negative impact of grants on persistence was due to insufficient aid. The negative impact of insufficient aid on retention supported previous research (Cofer & Somers, 2001; Heller, 1999; Hippensteel, St. John, & Starkey, 1996; Paulsen & St. John, 2002; St. John & Starkey, 1995) that found that persistence and degree attainment were negatively correlated with increases in net tuition cost. The greater the reliance on grants in the financial aid package the greater the probability of retention. The negative impacts of tuition on retention were moderated by grants, specifically Pell Grants (Chen & DesJardins, 2008; Chen & DesJardins, 2010; Dowd A. C., 2004) However, it should be
noted that Hippensteel, St. John and Starkey (1996) found that student aid had not been enough to offset the negative effect of tuition on retention.

Minimal research has been done to consider the impact of adding lottery tuition assistance to the financial aid package at technical colleges in South Carolina. State grants have been included in the research and have generally had positive impacts on retention (Dowd A. C., 2004). Davids (2006) utilized logistic regression to study LTA as part of a financial aid package at a technical college in South Carolina and did not find a significant relationship between LTA and persistence to graduation or a relationship between a financial aid package including LTA and Pell grant with persistence to graduation. She found a significant relationship between the LIFE scholarship and persistence to graduation. Financial aid packages were an important component of retention research and research has shown that the components of the financial aid packages and their impact on net tuition costs have a relationship with retention and degree attainment (Chen & DesJardins, 2010; Heller, 1999). The relationship between financial aid, net cost, and retention has been demonstrated to exist for two-year college students. Two-year college students were more responsive to tuition increases and experienced a greater impact on retention and degree attainment when aid did not offset the tuition increases (Heller, 1999; Hippensteel, St. John, & Starkey, 1996; St. John & Starkey, 1995).

Summary

The review of the literature provided research into the development of two-year colleges and how financial assistance to two-year colleges became dependent on indirect
aid through students. The research examined the factors related to student retention and their significance according to various theories such as Tinto’s Student Integration Model and Bean’s Student Attrition Model. The impact of financial aid specifically at two-year colleges was presented. Chapter 3 presents the methodology and research procedures utilized in this study.
CHAPTER THREE
RESEARCH DESIGN

Introduction

The purpose of this study was to examine the relationship between lottery tuition assistance, unmet financial need and retention. Retention was defined as enrollment in Fall, 2009 by students who started in Fall, 2008. The research was guided by these questions.

1. Is unmet financial need a predictor of retention?
2. How does the addition of lottery tuition assistance to a financial aid package reduce the unmet financial need?
3. What are the characteristics of students who receive lottery tuition assistance?

This chapter discusses the methodology and procedures utilized in the research design. In addition, the population, sample, variables, research hypothesis, statistical procedures and analysis procedures are described in the chapter.

Research Design

This study was a descriptive, predictive study that analyzed whether lottery tuition assistance and unmet financial need served as predictors of retention and described how lottery tuition assistance reduced the unmet financial need. The researcher utilized a path analysis to test a priori conceptual model of the relationship between demographic, academic and financial variables and retention. A path analysis was an appropriate method to examine interactions among variables, evaluate indirect factors when there is a chain of influence or there is more than one dependent variable (Ahn, 2002; American
The a priori conceptual model is shown in Figure 2.

Figure 2 Demographic, Academic and Financial Impacts on Retention

The first research question was addressed by assessing the fit of the a priori conceptual model to the data. The fit of the a priori model to the data was evaluated and modification indices were evaluated to determine if improvements could be made to the model. A post hoc analysis was later used to improve the model based on modification indices. Once the conceptual model was finalized and deemed plausible, then the estimated effects of the demographic, academic and financial variables were described using the model.
The second and third research questions were addressed through an examination of descriptive statistics. The researcher examined the descriptive statistics for lottery tuition assistance and unmet financial need to answer the second research question. Descriptive statistics were examined by the researcher to discern the characteristics of students who received lottery tuition assistance.

Path Analysis

Path analysis techniques were first developed in the early 1900’s by Sewall Wright, who utilized path analysis techniques in agricultural research. The technique went unnoticed in the social sciences until the 1960’s (American Psychological Association, 2006; Lleras, 2004). Path analysis was brought into the social sciences in the 1960’s and began to be utilized more prominently in the 1970’s with the introduction of computer programs that could perform the calculations (Mertler & Vannatta, 2010). The technique has been used to test models founded in theory (American Psychological Association, 2006; Streiner, 2005).

Path analysis methodology is an extension of multiple regression techniques that allow researchers to examine theories about causation and chains of influence. Multiple regression defines variables as dependent or independent, while path analysis defines variables as endogenous or exogenous. Exogenous variables are caused by factors outside of the model. Endogenous variables are variables that can be explained by factors in the model and may include outcome variables or intervening endogenous variables. Path analysis requires that researchers utilize theory to identify exogenous and endogenous variables in a conceptual model. The sequence of the variables and direction
of paths between variables form the path model to be tested. Because researchers identified the sequence of the variables and the direction of the paths between variables, path analysis was called causal modeling for many years. However, path analysis methodology does not prove causation but rather allows for a model to be rejected as unlikely or deemed plausible (Lleras, 2004; Mertler & Vannatta, 2010; Streiner, 2005).

Once a conceptual model is developed a priori, it can be analyzed utilizing path analytic techniques. The first step in path analytic techniques is to screen the raw data sample and select the appropriate estimator for the path analysis. A large majority of research studies utilized maximum likelihood estimation; however, maximum likelihood is not recommended for categorical or non-normal data. For data that is non-normal and/or categorical, a robust weighted least squares (WLSMV) estimator is recommended (Brown, 2006; Byrne, 2012).

Path analytic techniques using the WLSMV estimator calculates goodness of fit statistics that are used to determine if a model is rejected or deemed plausible. Common goodness of fit statistics are chi-square, standardized root mean square residual (SRMR), root mean square error of approximation (RMSEA), comparative fit index (CFI) and the Tucker-Lewis Index (TLI) (Brown, 2006; Byrne, 2012; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Muller, 2003). While acceptable values for goodness of fit have been debated, Hu and Bentler (1999) recommended (a) SRMR close to .08 or below, (b) RMSEA close to .06 or below, (c) CFI and TLI close to .95 or higher. A recommended value for chi-square was not reported because of sensitivity to sample
size and non-normal data. Goodness of fit indexes are evaluated from multiple fit categories to determine if a model should be rejected or deemed plausible (Brown, 2006). After a conceptual model is deemed plausible, the modification indices are reviewed to determine if improvements can be made to the conceptual model. Improvements are only made if adding the path is supported by empirical, conceptual or practical considerations. Each modification to the model is evaluated to determine if it improves the model fit and is a significant change. Goodness of fit indexes are reviewed to determine if the model fit improves and changes in chi-square are evaluated to determine if it is a significant change. The final step in the path analysis is to evaluate the model for statistically non-significant paths. Statistically non-significant paths are removed to make the model parsimonious. The researcher determines which paths are insignificant by evaluating the z-score of estimates calculated by the path analysis estimator. Statistically non-significant paths are removed and the model fit statistics evaluated to determine if the goodness of fit statistics are negatively impacted. The change in chi-square is evaluated to determine if the change in the model was significant. After the final change is made to the model, the effects on the outcome variable are reported (American Psychological Association, 2006; Brown, 2006; Byrne, 2012; Mertler & Vannatta, 2010).

Path Models and Structural Models Used to Study Retention

Bean (1982) utilized a path analysis to test a parsimonious model based on turnover in a work environment. Bean’s model is included as Figure 3. Bean tested the model for high-confidence men, low-confidence men, high-confidence women and low-
confidence women. He found that students from these different groups leave college for different reasons; however, for all of the groups, grades were an important contributor. Overall, intent to leave and grades were the top two variables predicting retention. The adjusted $R^2$ for retention ranged from .389 for low-confidence men to .493 for high-confidence women.


Bean (1985) and Bean and Metzner (1985) utilized path analysis to test models of student attrition based on Tinto and Bean’s theories during the 1980’s. Bean (1985) tested a model based on academic factors, social-psychological factors and environmental factors acting through three intervening variables: (a) college grades, (b) institutional fit and (c) institutional commitment to predict retention. Bean’s model is shown in Figure 4.
In the model, Bean argued that grades were an intervening variable that were a result of academic factors instead of a precursor to academic integration. Bean’s criterion was dropout syndrome. Bean’s model explained 47% ($R^2 = .47$) of the variance in dropout syndrome for freshman at a major mid-western university and supported the hypothesis that finances had a negative influence on dropout syndrome.


Bean and Metzner (1985) conducted a literature review and proposed a model for non-traditional students. They proposed that non-traditional students (older, part-time and commuter) were influenced by different factors than traditional students. They recommended that research into institutions that served non-traditional students should consider the variables shown in Figure 5. Bean and Metzner (1985) theorized that students with poor academic performance would drop out at higher rates than students
who performed well and that GPA was primarily affected by prior academic performance in high school and the student’s educational goals. Because Bean and Metzner (1985) were studying non-traditional students, they added background variables that had not been included in Bean’s previous work.

Nora (1987) utilized a structural model to test Tinto’s theory with Chicano students. The model is shown below in Figure 6. The results for Nora’s model supported a plausible model with a goodness of fit index equal to .920, adjusted goodness of fit index equal to .840 and root mean square residual equal to .098.

Figure 5 A Conceptual Model of Nontraditional Student Attrition. Adapted from “A Conceptual Model of Nontraditional Undergraduate Student Attrition,” by J.P. Bean and B. S. Metzner, 1985, American Educational Research Journal, Volume 55(4), p. 491

Nora (1987) utilized a structural model to test Tinto’s theory with Chicano students. The model is shown below in Figure 6. The results for Nora’s model supported a plausible model with a goodness of fit index equal to .920, adjusted goodness of fit index equal to .840 and root mean square residual equal to .098.
Figure 6: Structural Equation Model of Chicano College Student Retention. Adapted from “Determinants of Retention among Chicano College Students: A Structural Model,” by A. Nora, 1987, Research in Higher Education, Volume 26(1), p. 37

Nora’s research did not fully support Tinto’s model as Nora found that academic and social integration did not have significant direct effects on retention. Institutional commitment and goal commitment influenced by high school grades and encouragement by others had a larger direct effect on retention. Nora’s research supported the contention that the underlying cultural assumptions in Tinto’s social integration and academic integration constructs were not applicable to underrepresented groups. Social and academic integration as defined in Tinto’s theory were not the most important factors to consider when administrators were making decisions about retention of underrepresented
groups on their campuses (Dowd, Sawatzky, & Korn, 2011; Gonzalez, 2000-2001; Rendon, Jalomo, & Nora, 2000).

Nora (1990) developed a model based on Tinto and Bean’s theories to test the impact of financial aid on Hispanic students at a community college. Nora found Pell grants, loans, workstudy and state need based aid were significantly and positively related to retention. The model is shown in Figure 7. Nora’s model was a plausible model that found that a significant positive effect of financial aid on retention. The effect of financial need on retention was negative, but the effect although significant was smaller than financial aid on retention.

![Figure 7 Structural Equation Model of Aid Programs](image)

*Nora (1990)*

Figure 7 Structural Equation Model of Aid Programs. Adapted from “Campus-based Aid Programs as Determinants of Retention among Hispanic Community College Students,” by A. Nora, 1990, The Journal of Higher Education, Volume 61(3), p. 317
Cabrera, Stampen and Hansen (1990) tested Tinto’s theory, but utilized an economic perspective to add ability-to-pay. The authors theorized that the influence of academic integration, goal commitment, social integration and institutional commitment was moderated by ability-to-pay. Their model is shown in Figure 8. Cabrera, Stampen and Hansen (1990) found that ability-to-pay was significantly related to persistence and that when added to the model, the model explained 23% of the variance in persistence. Their results also indicated that ability-to-pay moderated the influence of cost of attendance and goal commitment. Their findings did not support a significant relationship between social integration or academic performance and retention.

Cabrera, Nora and Castaneda (1992) continued the line of research into the interaction of financial variables with noneconomic variables: (a) significant others’ influence, (b) precollege academic achievement, (c) academic and social integration, (d) goal and institutional commitments, and (e) intent to persist. The researchers noted that financial aid had not been considered an integral part of retention studies because there was not a significant difference in the retention of aided and non-aided students in previous studies. They theorized that the lack of significant difference was due to the difference between aided and non-aided students’ family background and socio-economic status and that financial aid was effective because it made lower socio-economic students as likely to persist as higher socio-economic students. Figure 9 graphically displays the model. Cabrera, Nora and Castaneda’s (1992) findings supported a plausible model, with the goodness of fit index equal to .996, adjusted goodness of fit index equal to .985 and the root mean square residual equal to .035. All measures of goodness of fit were found to be significant. Their conceptual model indicated that intent to persist had the largest total effect on retention followed by GPA and financial aid respectively. Financial aid was found to have a significant impact on intent to persist. The study results were contrary to earlier studies in that they supported the theory that financial aid facilitates academic and social participation.
Cabrera, Nora and Castaneda (1993) tested another model that integrated Tinto and Bean’s theories of student attrition. The model is included as Figure 10. The model was a plausible model that accounted for 45% of the variance in persistence. The study addressed the role of external factors in shaping perceptions of first time students at a
large southern urban institution. They found that intent to persist had the largest effect on retention and GPA had the second largest impact. They also found that finance attitudes were not significantly related to persistence. The results demonstrated that there was a complex relationship between the various factors affecting retention and that external factors have an impact on the perceptions of students.


Rivas, Sauer, Glynn and Miller (2007) developed a structural model to test whether the pre-matriculation attitudes of students who persisted were different from students who dropped out. The hypothesized model is included as Figure 11. They tested the model on a sectarian northeast private college and found that there were significant differences in matriculation attitudes between students who persisted and students who did not. They did not find a significant difference between the financial attitudes of
students who persisted and students who dropped out. The results also indicated that students who feared they would fail courses were more likely to dropout.


While each of the studies discussed in this section utilized a different path or structural model, they all used a combination of demographic, academic and financial variables to predict retention. The findings of the models were not in agreement on what factors were the strongest predictors of retention. The models that addressed underrepresented or non-traditional students supported concerns about the applicability of academic and social integration constructs to underrepresented and non-traditional students.
Methodology

This study focused on the relationship between lottery tuition assistance, unmet financial need and retention. The conceptual model to be tested was based on variables identified in previous research and available variables in the secondary data source. Data screening was performed to identify missing data and variables with significant skew or kurtosis. Missing data was imputed using SPSS version 21 and variables with significant skew or kurtosis were transformed to ordinal data.

MPlus version 7.11 was used to test the conceptual model. Due to the dichotomous nature of the dependent variable, a weighted least squares estimator was used. The WLSMV estimator was robust to non-normal data. (Brown, 2006; Byrne, 2012) The output of MPlus was used to determine the fit of the conceptual model to the data. After a review of the model fit statistics, the modifications indices were examined and paths that were recommended by the modification indices were added one at a time and the model was rerun to determine if the added path improved the model. The improvement in the model was evaluated by an inspection of fit statistics and by the change in the chi-square statistic. The process was repeated until no further improvement could be made to the model. As suggested by Brown (2006) and Byrne (2012), only changes that were supported by theory or practical experience were made during the post hoc process. After the final review of the model fit, the researcher reviewed the Mplus output for paths in the model that were statistically non-significant. Statistically non-significant paths were deleted from the model one at a time and the model was rerun and reviewed for model fit. Removal of paths that caused statistically insignificant changes to
the model were kept. Some statistically insignificant paths were left in the model due to model fit statistics and significant changes in the chi-square value. Once a final plausible model was determined, the effects of the variables including direct and indirect were reported.

Variables

The endogenous variables included in the study were the (a) continuous variable college GPA, (b) categorical (ordinal) variable unmet financial need and (c) dichotomous variable retention. Endogenous variables are variables that are explained by other variables in the model. The study used retention as a dichotomous endogenous variable, retained or not retained. Retention was defined as first time students who attended Greenville Technical College in Fall, 2008 and returned in Fall, 2009.

The exogenous variables were related to student demographic, academic and financial variables. The exogenous financial variables were: (a) LIFE scholarship recipient, (b) amount of need based grants, (c) amount of student loans (d) amount of lottery tuition assistance and (d) expected family contribution. These variables were chosen because they represented the types of aid available to students at Greenville Technical College (Greenville Technical College, 2013) and were available in the data source.

The selection of the variables supported The American Psychological Association statement “The best approach for selecting predictors is based on knowledge of established relations between predictor and criterion variables reported in the literature. In addition, predictor variables are often selected because the researcher is guided by a
theory that suggests relevant predictors of a dependent variable” (2006, p. 231). The types of aid were important because different types of aid have been shown to have differential impacts on the retention of different groups of students (Chen, 2008; Chen & DesJardins, 2008; Chen & DesJardins, 2010; Dowd A. C., 2004; Heller, 1997; Hippensteel, St. John, & Starkey, 1996; Kim, 2007; St. John, 1990). The research examining the relationship between different types of aid and retention has not reached consistent conclusions. St. John and Starkey (1995) found loan amounts were negatively associated with persistence for low income students. Heller (2003) supported St. John and Starkey’s finding that grant awards are predictors of post-secondary success. Chen and DesJardins (2008) found that loans and workstudy aid were significantly associated with lowering the risks of dropout. Dowd (2004) found that state grants and federal loans had a positive impact on persistence, but that other forms of aid did not. Based on the literature review, variables for the different types of financial aid were considered in the analysis (Chen & DesJardins, 2008; Chen & DesJardins, 2010; Dowd A. C., 2004; Dowd & Coury, 2006; Hippensteel, St. John, & Starkey, 1996; Kim, 2007; Paulsen & St. John, 2002).

Students’ ability-to-pay was measured by expected family contribution (EFC). The EFC calculation was made by the Federal Government to determine how much students could contribute to their education. The Federal Government calculated the EFC from data submitted on the Free Application for Federal Student Aid. A lower EFC was indicative of a smaller amount of available resources that could be used by students to pay for their education. Although EFC was used in this study to represent students’
ability-to-pay in the calculation of unmet financial need, some researchers have argued that EFC served as a proxy for socio economic status (Fenske, Porter, & DuBrock, 2000; Nora, 1990).

Exogenous demographic variables were considered in the study. Demographic variables were: (a) gender, (b) age, and (c) ethnicity. Demographic variables were included because prior research indicated that students from different backgrounds respond to types of financial aid differently (Cofer & Somers, 2001; Dowd & Coury, 2006; Feldman, 1993).

Dowd and Coury (2006) found that women persist at higher rates than men. Fenske, Porter and DuBrock (2000) found that for Science, Engineering and Mathematics majors, women received less financial aid than males. These studies indicated that gender may affect the relationship between financial aid and retention. Many studies have indicated that underrepresented groups respond differently to various forms of financial aid than whites; therefore, ethnicity was included (Chen & DesJardins, 2010; Fenske, Porter, & DuBrock, 2000; Kim, 2007; Nora, 1990). Community college students were different than traditional university students and the average age at community colleges was usually higher and adult students reacted differently to different aid types than younger students (Dowd & Coury, 2006; Hippensteel, St. John, & Starkey, 1996).

Academic variables were considered in the study. Academic variables included: (a) credit hours, (b) GPA, (c) number of developmental classes, (d) academic goal, (e) degree level, and (f) major. Academic variables were included because prior research
indicated that student preparation and academic experience were related to retention (Cofer & Somers, 2001; Dowd & Coury, 2006; Feldman, 1993).

Student preparation was represented by the number of developmental classes a student was required to take. Greenville Technical College used standardized placement tests to determine if a student placed into developmental classes. Since placement into developmental classes was based on standardized placement test scores, utilizing developmental classes for academic preparation was consistent with St. John’s (1990) use of test scores to represent academic preparedness. While high school preparation has been used to examine academic preparedness, many two-year college students are older and their high school GPA is dated (Nora, 1990). The number of developmental classes served as a predictor of academic preparedness that was consistent for all students (Cofer & Somers, 2001; St. John, 1990).

Students’ academic experience was represented by academic goal, level, major and credit hours. The academic goal represented students’ aspirations: (a) no degree, (b) certificate/diploma, (c) associate degree or (d) transfer. The academic level and major represented the path chosen to reach their goal and credit hours represented their enrollment intensity. Credit hours were directly related to financial aid since students’ access to financial aid and amount of financial aid were affected by how many credit hours the student took (Cofer & Somers, 2001; Feldman, 1993). The final academic variable was college GPA. College GPA has been shown to be a strong predictor of retention (Chen, 2008; Chen & DesJardins, 2008; Hippensteel, St. John, & Starkey, 1996; St. John, 1990).
Research Hypotheses

The following research hypothesis was tested as part of this research study.

Hypothesis 1: The conceptual path model as shown in Figure 2 will fit the data.

TLI, CFI and RMSEA fit statistics were used to determine the fit of the conceptual path model as shown in Figure 2 to the data.

Institution

According to the website (Greenville Technical College, 2011), Greenville Technical College was founded in 1962 as one of the 13 South Carolina Technical Education Centers. The technical educational centers were founded to promote economic development, but their mission expanded to include university transfer programs in the early 1970’s. The 13 Technical Educational Centers would become 16 technical colleges serving South Carolina. Greenville Technical College had a service area of one county, Greenville County. Greenville Technical College was a comprehensive community college offering 36 associate degrees, 8 diplomas and 83 certificates in technical and university transfer majors (Greenville Technical College, 2011). As one of the oldest and largest technical colleges in South Carolina, Greenville Technical College had a mission to drive personal and economic growth through learning.

Greenville Technical College enrolled 3,328 first time freshman in Fall, 2008 and had a total enrollment of 14,414 students. Part-time students represented 56.5% of the total enrollment and females were 60% of the total enrollment. Black/African Americans represented 24% of the total enrollment while White/non-Hispanics represented 66.9% of
the total enrollment. Hispanics represented 4.0% of the total enrollment (SC Commission on Higher Higher Education, 2009).

**Cohort**

The cohort for this research study consisted of first time freshman entering in Fall, 2008 who were enrolled in a minimum of six credit hours. Greenville Technical College enrolled 3,328 freshmen who took at least 6 credit hours in the Fall, 2008. Twenty-nine point one percent of first time freshmen were part-time students. Females made up 55.4% of the first time freshmen and 28.2% of first time freshmen were African-American.

**Data Used for the Study**

A secondary data source was used for this study. A request was made to the Senior Database Administrator at Greenville Technical College for the cohort listing of first-time freshmen for Fall, 2008 and their enrollment status in Fall, 2009. The report generated a study identification number for the first-time freshmen and removed identifying information such as Social Security number, address and birthday from the data. The following data was transmitted:

- Generated study ID
- gender
- ethnicity
- age
- GPA
- expected family contribution
- developmental classes
• Goal
• Level
• Major
• credit hours
• amount of Pell grant
• amount of subsidized loan
• amount of unsubsidized loan
• amount of SC Need Based Grant
• amount of Lottery Tuition Assistance
• amount of LIFE scholarship

Data Analysis

Data was entered into MPlus version 7.11 for analysis and exogenous variables were coded. The data code used in Mplus is provided in parenthesis.

Student Demographics

Gender (gen)
Age (age)
Ethnicity (eth)

Academics Variables

Goal (goal)
Major (maj)
Academic Level (lev)
Credit Hours (ch)
Developmental Classes (dev)

Financial Variables

Expected Family Contribution (efc)

Need Based Grants (nbg)

Loans (loan)

LIFE Scholarship (life)

Lottery Tuition Assistance (lta)

Because ethnicity, major and goal were nominal variables, they were dummy coded for entry into the analysis. The coding for each of these variables was:

African American (ethaa)

White/Non-Hispanic (ethw)

Other Ethnicity (etho)

Associate of Science and Related Majors (majas)

Business Related Majors (majbus)

Computer Science, Engineering and Related Majors (majen)

Health Related Majors (majh)

Other Majors (majo)

No Goal of Earning a Degree (goalnd)

Goal of Earning a Certificate (goalcd)

Goal of Earning an Associate Degree (goalad)

Goal of Transferring (goaltr)

The endogenous variables are included below.
Summary of Procedures

This study focused on determining if the conceptual path model shown in Figure 2 would fit the data and whether lottery tuition assistance and unmet financial need were significant predictors of retention. The effects of financial aid, moderated by unmet financial need, on retention were investigated. Path analysis techniques were used to test the conceptual model.

A secondary data source of first time freshman taking at least six credit hours at Greenville Technical College was obtained from the college. Data were coded and entered into MPlus. The results were analyzed to answer the research questions and current literature was reviewed in the study.
CHAPTER FOUR

PRESENTATION OF FINDINGS

Introduction

The purpose of this study was to test a conceptual model of retention at a public two-year college. The study sought to answer the following questions.

1. Is unmet financial need a predictor of retention?

2. How does the addition of lottery tuition assistance to a financial aid package reduce the unmet financial need?

3. What are the characteristics of students who receive lottery tuition assistance?

Three endogenous variables were included in the study. These variables were (a) unmet financial need, (b) GPA and (c) retention. The exogenous variables included (a) gender, (b) age, (c) ethnicity, (d) goal, (e) major, (f) level, (g) credit hours, (h) developmental classes, (i) expected family contribution, (j) need based grants, (k) loans, (l) LIFE Scholarship, and (m) lottery tuition assistance.

The data was obtained from the student record database at Greenville Technical College and consisted of a Fall, 2008 cohort of first time students taking a minimum of six credit hours. The cohort consisted of 3,328 first time students who took at least six credit hours in Fall, 2008. Part-time students made up 29.1% of the cohort. The cohort was 55.4% female and 28.2% were Black/African-American. The cohort had a 45.6% retention rate, while 35.7% received lottery tuition assistance. The study included demographic data of students who received lottery tuition assistance.
MPlus version 7.11 was used to analyze the conceptual model and utilized a robust weighted least squares (WLSWV) estimator due to the categorical nature of the endogenous variables. This chapter provides the descriptive statistics of the cohort, path analysis statistics including the fit of the model and descriptive statistics of students receiving lottery tuition assistance.

**Cohort Descriptive Statistics**

The cohort consisted of first time students taking more than five credit hours who entered in Fall, 2008. The descriptive statistics for the demographic, financial and academic variables are described below.

**Age Distribution**

The age distributions of the cohort (n=3,328) showed that 2,175 (63.4%) were under the age of 22. Students between the ages of 23 and 34 made up 21.4% (711) of the cohort. Less than 15% of students were over the age of 34. The average age of students in the cohort was 23.9. The over 54 age group had the highest retention rate at 47.5%. The age distribution and retention rate are summarized in Table.

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Retained</th>
<th>Number</th>
<th>Percent</th>
<th>Not Retained</th>
<th>Number</th>
<th>Percent</th>
<th>Total</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;22</td>
<td>Retained</td>
<td>995</td>
<td>45.8</td>
<td>Not Retained</td>
<td>1,180</td>
<td>54.2</td>
<td></td>
<td>2,175</td>
<td>65.4</td>
</tr>
<tr>
<td>22 to 34</td>
<td>Retained</td>
<td>317</td>
<td>44.6</td>
<td>Not Retained</td>
<td>394</td>
<td>55.4</td>
<td></td>
<td>711</td>
<td>21.4</td>
</tr>
<tr>
<td>35 to 54</td>
<td>Retained</td>
<td>186</td>
<td>46.3</td>
<td>Not Retained</td>
<td>216</td>
<td>53.7</td>
<td></td>
<td>402</td>
<td>12.1</td>
</tr>
<tr>
<td>&gt;54</td>
<td>Retained</td>
<td>19</td>
<td>47.5</td>
<td>Not Retained</td>
<td>21</td>
<td>52.5</td>
<td></td>
<td>40</td>
<td>1.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,328</td>
<td>100</td>
</tr>
</tbody>
</table>

(n=3,328)
Gender Distribution

The cohort (n=3,328) consisted of 1,845 (55.4%) females and 1,483 (44.6%) males. The data is summarized in Table 2. Females had a higher retention rate (48.7%) when compared to the retention rate of males (41.7%)

Table 2 Gender Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>Gender</th>
<th>Retained Number</th>
<th>Percent</th>
<th>Not Retained Number</th>
<th>Percent</th>
<th>Total Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>898</td>
<td>48.7</td>
<td>947</td>
<td>51.3</td>
<td>1,845</td>
<td>55.4</td>
</tr>
<tr>
<td>Male</td>
<td>619</td>
<td>41.7</td>
<td>864</td>
<td>58.3</td>
<td>1,483</td>
<td>44.6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3,328</td>
<td>100</td>
</tr>
</tbody>
</table>

Ethnicity Distribution

The ethnicity distributions of the cohort (n=3,328) showed that 2,175 (63.4%) were White/Non-Hispanic. Black/African-American made up 28.2% (937) of the cohort, while 132 students (4.0%) were Hispanic. Asian, Pacific Islander, Native American and unknown ethnicity students made up 5.3% (184) of the cohort. The Ethnicity –Other participants had the highest retention rate at 50.0%. The ethnicity distribution and retention rate are summarized in Table 3.
Financial Aid Distribution

More students received need based grants than any other form of financial aid. A need based grant was awarded to 1,559 (46.8%) students. Lottery tuition assistance was awarded to 1,189 (35.7%) students, while 513 (15.4%) students received a LIFE Scholarship. No aid was awarded to 519 (15.6%) students, while 1,219 (36.6%) students took out a loan. Students receiving LIFE Scholarships were retained at the highest rate (64.1%) and students who received no aid were retained at the lowest rate (21.2%). The financial aid distribution and retention rate are summarized in Table 4.

Table 4 Financial Aid Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>Financial Aid Type</th>
<th>Retained</th>
<th></th>
<th>Not Retained</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>LTA</td>
<td>548</td>
<td>46.1</td>
<td>641</td>
<td>53.9</td>
<td>1,189</td>
<td>35.7</td>
</tr>
<tr>
<td>LIFE Scholarship</td>
<td>329</td>
<td>64.1</td>
<td>184</td>
<td>35.9</td>
<td>513</td>
<td>15.4</td>
</tr>
<tr>
<td>Need Based Grants</td>
<td>765</td>
<td>49.1</td>
<td>794</td>
<td>50.9</td>
<td>1,559</td>
<td>46.8</td>
</tr>
<tr>
<td>Loans</td>
<td>643</td>
<td>52.8</td>
<td>576</td>
<td>47.2</td>
<td>1,219</td>
<td>36.6</td>
</tr>
<tr>
<td>No Aid</td>
<td>110</td>
<td>21.2</td>
<td>409</td>
<td>78.8</td>
<td>519</td>
<td>15.6</td>
</tr>
</tbody>
</table>

Note: Students may receive more than one form of aid so the total in this table does not equal n=3,328.
Ability to Pay Distribution

The ability of the participants to pay was measured through the expected family contribution (EFC) variable. Students with an expected family contribution of $0 made up 31.6% (1,050) of the cohort. Students who had an expected family contribution that exceeded the total cost of attendance made up 41.6% (1,342) of the cohort. The total cost of attendance for the 2008-2009 academic year was $12,322 (National Center for Education Statistics, 2009). Students who did not file a Free Application for Federal Student Aid (FAFSA), and therefore were missing their EFC in the database, had the lowest retention rate at 32.3%. The next lowest retention rate, 40.5% (425), applied to students with a $0 EFC. All other categories of EFC had a retention rate between 49.9% and 53.7%. The ability to pay distribution and retention rate are summarized in Table 5.

Table 5 Ability to Pay Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>EFC</th>
<th>Retained</th>
<th>Not Retained</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>$0</td>
<td>425</td>
<td>40.5</td>
<td>625</td>
</tr>
<tr>
<td>$1 to $6,250</td>
<td>304</td>
<td>50.2</td>
<td>302</td>
</tr>
<tr>
<td>$6,251 to $12,500</td>
<td>169</td>
<td>49.9</td>
<td>170</td>
</tr>
<tr>
<td>$12,501 to $25,000</td>
<td>193</td>
<td>51.1</td>
<td>185</td>
</tr>
<tr>
<td>&gt;$25,000</td>
<td>305</td>
<td>53.7</td>
<td>263</td>
</tr>
<tr>
<td>Missing</td>
<td>121</td>
<td>32.3</td>
<td>266</td>
</tr>
<tr>
<td>Total</td>
<td>1,050</td>
<td></td>
<td>1,050</td>
</tr>
</tbody>
</table>

Unmet Financial Need Distribution

The unmet financial need of students was calculated by subtracting the EFC and all forms of financial aid from the total cost of attendance. Students with unmet need of $0 made up 32.1% (1,070) of the cohort. Students with an unmet need greater than $0
made up 56.2% (1,871) of the cohort. No measure of unmet financial need was calculated for students who did not file a FAFSA. The unmet financial need for these students was classified as missing. Students with a missing unmet financial need made up 11.6% (387) of the cohort. Students with an unmet financial need between $1 and $2,000 had the highest retention rate, 60.8%. Students with an unmet financial need greater than $10,000 had the lowest retention rate, 24.0%. The unmet financial need distribution and retention rate are summarized in Table 6.

Table 6 Unmet Financial Need Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>Unmet Financial Need</th>
<th>Retained</th>
<th></th>
<th>Not Retained</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>$0</td>
<td>557</td>
<td>52.1</td>
<td>513</td>
<td>47.9</td>
<td>1,070</td>
<td>32.1</td>
</tr>
<tr>
<td>$1 to $2,000</td>
<td>76</td>
<td>60.8</td>
<td>49</td>
<td>39.2</td>
<td>125</td>
<td>3.8</td>
</tr>
<tr>
<td>$2,001 to $4,000</td>
<td>78</td>
<td>46.4</td>
<td>90</td>
<td>53.6</td>
<td>168</td>
<td>5.0</td>
</tr>
<tr>
<td>$4,001 to $6,000</td>
<td>118</td>
<td>50.2</td>
<td>117</td>
<td>49.8</td>
<td>235</td>
<td>7.1</td>
</tr>
<tr>
<td>$6,001 to $8,000</td>
<td>235</td>
<td>52.2</td>
<td>215</td>
<td>47.8</td>
<td>450</td>
<td>13.5</td>
</tr>
<tr>
<td>$8,001 to $10,000</td>
<td>239</td>
<td>47.2</td>
<td>267</td>
<td>52.8</td>
<td>506</td>
<td>15.2</td>
</tr>
<tr>
<td>$&gt;10,000</td>
<td>93</td>
<td>24.0</td>
<td>294</td>
<td>76.0</td>
<td>387</td>
<td>11.6</td>
</tr>
<tr>
<td>Missing</td>
<td>121</td>
<td>31.3</td>
<td>266</td>
<td>68.7</td>
<td>387</td>
<td>11.6</td>
</tr>
<tr>
<td>Total</td>
<td>3,328</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(n=3,328, missing=387)

Academic Preparation Distribution

The academic preparation of students was measured through the variable, developmental courses. Greenville Technical College utilized placement test scores to determine whether a student was required to take developmental courses. Students who were required to take at least one developmental course made up 39.4% (1,312) of the cohort. Students who took more than one developmental course had the lowest retention
rate, 42.5%. The academic preparation distribution and retention rate are summarized in Table 7.

Table 7 Academic Preparation Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>Academic Preparation</th>
<th>Retained</th>
<th>Not Retained</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Dev. Courses = 0</td>
<td>945</td>
<td>46.9</td>
<td>1071</td>
</tr>
<tr>
<td>Dev. Courses = 1</td>
<td>223</td>
<td>45.5</td>
<td>267</td>
</tr>
<tr>
<td>Dev. Courses &gt; 1</td>
<td>349</td>
<td>42.5</td>
<td>473</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>3,328</td>
</tr>
</tbody>
</table>

(n=3,328)

College GPA Distribution

Students with a college grade point average (GPA) below 1.0 made up 19.0% (631) of the cohort. Students with a GPA equal to 3.0 or higher made up 37.5% (1,248) of the cohort. Students with a GPA below 1.0 had the lowest retention rate, 12.0%. Students with a GPA equal to or above 3.0 had the highest retention rate, 59.1%. The GPA distribution and retention rate are summarized in Table 8.

Table 8 GPA Distribution and Retention Rate of the Participants

<table>
<thead>
<tr>
<th>Grade Point Avg.</th>
<th>Retained</th>
<th>Not Retained</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>GPA&lt;1</td>
<td>76</td>
<td>12.0</td>
<td>555</td>
</tr>
<tr>
<td>GPA 1 to 1.99</td>
<td>159</td>
<td>39.2</td>
<td>247</td>
</tr>
<tr>
<td>GPA 2 to 2.99</td>
<td>544</td>
<td>52.2</td>
<td>499</td>
</tr>
<tr>
<td>GPA &gt; 2.99</td>
<td>738</td>
<td>59.1</td>
<td>510</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>3,328</td>
</tr>
</tbody>
</table>

(n=3,328)
Summary of Descriptive Statistics

The Fall, 2008 cohort had a retention rate of 45.6% (1,517). A review of the demographics descriptive statistics showed that a majority of the students, 65.4% (2,175), were traditional aged college students between the ages of 16 and 21. Students over the age of 54 had the highest retention rate, 47.5%, but comprised the smallest segment, 1.2% (40), of the cohort. The gender distribution was 55.4% (1,845) female and 46.6% (1483) male. Females were retained at a higher rate, 48.7%, than males, 41.7%. White/non-Hispanic was the largest ethnicity and comprised 62.6% (2,083) of the cohort, while Black/African-American comprised 28.2% (937) of the cohort. Hispanics made up 4.0% (132) of the cohort, while Ethnicity-Other/Unknown comprised 5.3% (176) of the cohort. Ethnicity-Other/Unknown had the highest retention rate at 50% while Black/African-Americans had the lowest retention rate at 39.5%. White/non-Hispanics were retained at a rate of 47.9% and Hispanics were retained at a rate of 46.2%.

A review of the financial descriptive statistics showed that need based grants were the most common form of financial aid with 1,559 (46.8%) students receiving a need based grant, while LIFE scholarships were the least common form of aid with only 513 (15.4%) students receiving a LIFE scholarship. Lottery tuition assistance was given to 1,189 (35.7%) students and 1,219 (36.6%) students took out a loan. The cohort contained 519 (15.6%) students who received no aid. Students with no aid had the lowest retention rate, 21.2%, and students who received LIFE scholarships had the highest retention rate, 64.3%. 
When examining ability to pay, the largest category, 1,050 (31.6%), of students had an expected family contribution of $0. The smallest category, 339 (10.2%), of students had an expected family contribution between $6,251 to $12,500. Students who did not file a FAFSA and had a missing expected family contribution made up 11.6% (387) of the cohort. Students with an expected family contribution greater than $25,000 had the highest retention rate, 53.7%, and students with a $0 expected family contribution had the lowest retention rate, 40.5%.

A review of unmet financial need descriptive statistics revealed that 1,070 (32.2%) students had an unmet financial need equal to $0. Students with an unmet financial need between $6,001 and $8,000 made up 13.5% (450) of the cohort; 506 (15.2%) students had an unmet financial need between $8,001 and $10,000; and 387 (11.6%) students had an unmet financial need above $10,000. Unmet financial need was not calculated for 387 (11.6%) students who did not file a FAFSA. The students who did not file a FAFSA did not have an expected family contribution calculation. Students with an unmet financial need greater than $10,000 had the lowest retention rate, 24.0%, while students with an unmet financial need between $1 and $2,000 had the highest retention rate, 60.8%.

A review of the academic descriptive statistics showed that students required to take at least one developmental class made up 39.4% (1,312) of the cohort and 24.7% (822) of students were required to take more than one developmental class. A majority, 60.6% (2,016), of students were not required to take any developmental classes. Students who were required to take more than one developmental class had the lowest retention
rate, 42.5%, while students who did not take any developmental classes had the highest retention rate, 46.9%.

Students who had a GPA greater than 2.99 comprised the largest category, 1,248 (37.5%), of students, while 631 (19.0%) students scored below a 1.0 GPA. Students with a GPA higher than 2.99 had the highest retention rate, 59.1%, while students with a GPA below 1.0 had the lowest retention rate, 12.0%.

Data Screening

The data for each variable was analyzed to review the descriptive statistics. Table 9 includes the raw data descriptive statistics for each variable. Microsoft Excel 2007 was used to calculate the skew, kurtosis and variance of the variables. Unmet financial need and expected family contribution (EFC) had more than 10% missing data. SPSS version 21 was used to impute the missing data for EFC using a linear trend at point.
The raw data exhibited skew and kurtosis. All of the financial variables and the age variable had skew and kurtosis that indicated non-normal data and EFC had the largest skew, 3.76, and kurtosis, 19.79. The skew and kurtosis for the financial variables were due to a significant percentage of students with $0 aid, EFC or unmet financial need. The skew and kurtosis for age was due to the number of students between the ages of 16 and 22. Further review of the variables revealed that there were large differences in scale of the variables which led to significant differences between the variances.

The variables ethnicity, goal and major were nominal categorical variables. Muthen and Muthen (2012) recommended that nominal categorical variables be dummy coded for entry into the model. Ethnicity was dummy coded into (a) Black/African-American, (b) Other, and (c) White/non-Hispanic. White/non-Hispanic was the reference
category. Goal was dummy coded into (a) goal-no degree, (b) goal-certificate/diploma, (c) goal-associate degree, and (d) goal-transfer. Goal-associate degree was the reference category. Major was dummy coded into (a) major-associate science related, (b) major-business/public service related, (c) major-engineering/computer related, (d) major-health related, and (e) major-other related. Major-associate science related was the reference category. The model resulted compared the dummy coded variable to the reference category.

Muthen and Muthen (2012) recommended that when a mixture of categorical and continuous variables are used, that they be rescaled to have a variance between one and ten. Pasta (2009) recommended that continuous variables be transformed to categorical variables when the relationship may not be linear. Due to the different scales of the variables and variances much greater than ten, age and all financial variables were transformed to categorical ordinal variables. The descriptive statistics for the transformed data are shown in Table 10.
Table 10 Descriptive Statistics for Transformed Variables

<table>
<thead>
<tr>
<th>Variable Code</th>
<th>Variable Description</th>
<th>Variable Type</th>
<th>n</th>
<th>Missing</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>gen</td>
<td>gender</td>
<td>binary</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
<td>3328</td>
</tr>
<tr>
<td>age</td>
<td>age</td>
<td>ordinal</td>
<td>3328</td>
<td>0</td>
<td>4</td>
<td>1.49</td>
<td>1.31</td>
<td>0.64</td>
<td>0.564</td>
<td>0.64</td>
</tr>
<tr>
<td>eth</td>
<td>ethnicity</td>
<td>nominal</td>
<td>3328</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>goal</td>
<td>academic goal</td>
<td>nominal</td>
<td>3301</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ret</td>
<td>retained</td>
<td>binary</td>
<td>3328</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gpa</td>
<td>grade point average</td>
<td>continuous</td>
<td>3328</td>
<td>0</td>
<td>4</td>
<td>2.22</td>
<td>-0.53</td>
<td>-0.88</td>
<td>1.696</td>
<td></td>
</tr>
<tr>
<td>maj</td>
<td>program of study</td>
<td>nominal</td>
<td>3326</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ksv</td>
<td>desired credential</td>
<td>nominal</td>
<td>3326</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ch</td>
<td>credit hours</td>
<td>continuous</td>
<td>3328</td>
<td>0</td>
<td>6</td>
<td>25</td>
<td>11.93</td>
<td>-0.12</td>
<td>-0.13</td>
<td>9.888</td>
</tr>
<tr>
<td>dev</td>
<td>developmental studies</td>
<td>ordinal</td>
<td>3328</td>
<td>0</td>
<td>2</td>
<td>0.64</td>
<td>0.76</td>
<td>-1.19</td>
<td>0.724</td>
<td></td>
</tr>
<tr>
<td>efc</td>
<td>expected family contribution</td>
<td>ordinal</td>
<td>2941</td>
<td>387</td>
<td>0</td>
<td>4</td>
<td>1.59</td>
<td>0.43</td>
<td>-1.35</td>
<td>2.372</td>
</tr>
<tr>
<td>efc_i</td>
<td>expected family contribution</td>
<td>ordinal</td>
<td>3328</td>
<td>imputed</td>
<td>0</td>
<td>4</td>
<td>1.76</td>
<td>0.16</td>
<td>-1.50</td>
<td>2.799</td>
</tr>
<tr>
<td>nbg</td>
<td>need based grants</td>
<td>ordinal</td>
<td>3328</td>
<td>0</td>
<td>4</td>
<td>1.09</td>
<td>0.60</td>
<td>-1.21</td>
<td>1.642</td>
<td></td>
</tr>
<tr>
<td>loan</td>
<td>student loans</td>
<td>ordinal</td>
<td>3328</td>
<td>0</td>
<td>4</td>
<td>0.85</td>
<td>0.88</td>
<td>-0.82</td>
<td>1.412</td>
<td></td>
</tr>
<tr>
<td>life</td>
<td>LIFE Scholarship</td>
<td>binary</td>
<td>3328</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fa</td>
<td>lottery tuition assistance</td>
<td>ordinal</td>
<td>3328</td>
<td>0</td>
<td>2</td>
<td>0.63</td>
<td>0.79</td>
<td>-1.24</td>
<td>0.778</td>
<td></td>
</tr>
<tr>
<td>unmet</td>
<td>unmet financial need with missing data</td>
<td>ordinal</td>
<td>2941</td>
<td>387</td>
<td>0</td>
<td>6</td>
<td>2.66</td>
<td>0.04</td>
<td>-1.61</td>
<td>3.412</td>
</tr>
<tr>
<td>unmet_i</td>
<td>unmet financial need with imputed data</td>
<td>ordinal</td>
<td>3328</td>
<td>imputed</td>
<td>0</td>
<td>6</td>
<td>2.35</td>
<td>0.26</td>
<td>-1.59</td>
<td>5.509</td>
</tr>
<tr>
<td>ethaa</td>
<td>black/african american</td>
<td>binary</td>
<td>937</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ethw</td>
<td>white/non-hispanic</td>
<td>binary</td>
<td>2083</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ethh</td>
<td>hispanic</td>
<td>binary</td>
<td>132</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etho</td>
<td>other ethnicity includes hispanic</td>
<td>binary</td>
<td>308</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>majbus</td>
<td>business related majors</td>
<td>binary</td>
<td>1015</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>majcomp</td>
<td>computer science/engineering/technical related majors</td>
<td>binary</td>
<td>497</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>majh</td>
<td>health related majors</td>
<td>binary</td>
<td>1191</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>majoth</td>
<td>other majors</td>
<td>binary</td>
<td>319</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gosac</td>
<td>associate degree as goal</td>
<td>binary</td>
<td>1039</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gosch</td>
<td>transfer to four year college</td>
<td>binary</td>
<td>930</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>gosno</td>
<td>no degree as goal</td>
<td>binary</td>
<td>183</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Because the data still exhibited skew and kurtosis, the researcher utilized a robust weighted least squares (WLSMV) that was appropriate for non-normal data. Mplus is the only program that utilizes WLSMV as an estimator. (Brown, 2006) The nominal variables, ethnicity, goal, and major were dummy coded for entry into the model.

**Analysis of a Priori Model**

The first research question asked is unmet financial need a predictor of retention?

The a priori model shown in Figure 2 was tested using Mplus version 7.11 to determine if the model was plausible. The model fit was evaluated with the comparative fit index (CFI), Tucker-Lewis Index (TLI) and root mean square error of approximation (RMSEA). Chi-square was reported, but was not an accurate measure of model fit.
because it is sensitive to non-normal data and sample size (American Psychological Association, 2006; Hooper, Coughlan, & Mullen, 2008; Schermelleh-Engel, Moosbrugger, & Muller, 2003). The initial a priori model fit statistics were CFI equal to .867, TLI equal to .766 and RMSEA equal to .063. Brown (2006) recommended that a model was plausible if RMSEA was less than .05, and CFI and TLI were more than .9. Chi-square was 485.604 and significant at p < 0.05. The model had 34 degrees of freedom. The model fit indicators for the a priori model indicated a poor model fit, but the review of the modification indices indicated that improvements could be made to the model by adding paths. A post-hoc analysis was conducted to evaluate improvements to the a priori model.

**Post-hoc Analysis Results**

In the post-hoc analysis, the modification indices were reviewed to determine if paths could be added to the model that would improve the fit of the model to the data. Paths were only added that were supported by empirical, conceptual or practical considerations (Brown, 2006; Byrne, 2012). Each path was added one at a time and the model run again and the output reviewed for model fit statistics. The model fit statistics are reported for each model modification in Table 11.

A review of the modification indices indicated that paths should be added to predict GPA, unmet financial need and retention. The paths were added one at a time and the fit statistics and chi-square change evaluated to determine if the path was valid. Each path shown in Table 11 resulted in improved model fit statistics and significant changes in chi-square.
A review of the modification indices after the addition of the last path shown in Table 11 indicated that no further improvements could be made to the model. The model was then reviewed to determine if any paths were insignificant. Paths that were analyzed to be insignificant were removed from the model to make the model parsimonious. The estimate and z-score were reviewed to determine if a path was insignificant. The review indicated that paths between unmet financial need and ethnicity, gender and age were insignificant. Additionally, paths between GPA and level and major were insignificant. Each path was removed and the model run again to determine the impact of the path on the model fit statistics and chi-square. The paths removed from the model are shown in Table 12.

<table>
<thead>
<tr>
<th>Model (Paths Added)</th>
<th>Modification</th>
<th>R²</th>
<th>GPA</th>
<th>Retention</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>Chi-Square</th>
<th>df</th>
<th>Δchi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a priori n/a</td>
<td></td>
<td>0.949</td>
<td>0.16</td>
<td>0.298</td>
<td>0.063</td>
<td>0.867</td>
<td>0.766</td>
<td>485.604</td>
<td>34</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>2 GPA on needs based grant</td>
<td></td>
<td>0.949</td>
<td>0.216</td>
<td>0.277</td>
<td>0.053</td>
<td>0.909</td>
<td>0.834</td>
<td>344.264</td>
<td>33</td>
<td>141.34</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>3 GPA on lottery tuition assistance</td>
<td></td>
<td>0.949</td>
<td>0.182</td>
<td>0.288</td>
<td>0.04</td>
<td>0.951</td>
<td>0.909</td>
<td>197.375</td>
<td>32</td>
<td>146.889</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>4 GPA on unmet financial need</td>
<td></td>
<td>0.949</td>
<td>0.189</td>
<td>0.287</td>
<td>0.034</td>
<td>0.966</td>
<td>0.933</td>
<td>148.3</td>
<td>31</td>
<td>49.075</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>5 unmet financial need on credit hours</td>
<td></td>
<td>0.95</td>
<td>0.189</td>
<td>0.287</td>
<td>0.03</td>
<td>0.974</td>
<td>0.948</td>
<td>119.315</td>
<td>30</td>
<td>28.985</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>6 retention on level</td>
<td></td>
<td>0.95</td>
<td>0.191</td>
<td>0.297</td>
<td>0.026</td>
<td>0.981</td>
<td>0.961</td>
<td>92.786</td>
<td>29</td>
<td>26.529</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>7 retention on needs based grant</td>
<td></td>
<td>0.95</td>
<td>0.188</td>
<td>0.271</td>
<td>0.022</td>
<td>0.987</td>
<td>0.973</td>
<td>71.2665</td>
<td>28</td>
<td>21.5195</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>8 retention on LIFE Scholarship</td>
<td></td>
<td>0.95</td>
<td>0.179</td>
<td>0.278</td>
<td>0.016</td>
<td>0.994</td>
<td>0.986</td>
<td>48.871</td>
<td>27</td>
<td>22.3955</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>9 retention on loan</td>
<td></td>
<td>0.951</td>
<td>0.179</td>
<td>0.284</td>
<td>0.012</td>
<td>0.996</td>
<td>0.992</td>
<td>38.34</td>
<td>26</td>
<td>10.531</td>
<td>&lt; 0.005</td>
</tr>
</tbody>
</table>
Each path removed had an insignificant impact on the model except for GPA on developmental and GPA on major. Removal of the paths, GPA on developmental and GPA on Major, changed the model fit significantly and made the model not plausible.

The GPA on developmental path removal resulted in a significant change in chi-square equal to 421.841, \( p < 0.005 \). The model fit statistics were RMSEA = .053, CFI = .892 and TLI = .812. While the path of GPA on developmental was insignificant, prior research indicated that academic preparation has a relationship to GPA and is related to major and goal selection (Cabrera, Nora, & Castaneda, 1992; Crisp & Nora, 2010). Due to the significant changes in chi-square, model fit statistics and findings from prior research, the removal of the path GPA on developmental was rejected.

The GPA on major path removal also resulted in a significant change in chi-square equal to 1154.541, \( p < 0.005 \). The model fit statistics were RMSEA = 0.058, CFI =
0.747 and TLI = 0.681. While the path of GPA on major was insignificant, prior research indicated that GPA and major are related (Shaw, Kobrin, Patterson, & Mattern, 2012). Due to the significant changes in chi-square, model fit statistics and findings from prior research, the removal of the path GPA on major was rejected. The paths, GPA on developmental and GPA on major were added back into the model and the path, unmet financial need on age, was removed in the final step. The final model was a parsimonious plausible model.

In the final model, the paths GPA on all majors, GPA on Goal (transfer, no degree) and developmental classes were insignificant. The final model is shown in Figure 20. The fit statistics of the final model were RMSEA equal to .012, CFI equal to .996 and TLI equal to .992. Chi-square was equal to 44.624 (p=.0538) with 31 degrees of freedom. As discussed earlier in this chapter, chi-square was not an accurate indicator of model fit due to a large sample size and non-normal data.
The standardized model results of the revised model indicated that expected family contribution had the largest effect on unmet financial need and credit hours had the smallest effect. The $R^2$ showed that the model accounted for 28.4% of the variance in retention. The model accounted for 17.7% of the variance in GPA and 95.1% of the variance in unmet financial need. Although lottery tuition assistance had a total effect on retention equal to 0.131 and was a significant predictor, it was along an indirect path. Lottery tuition assistance did not have a direct effect on retention. LIFE had the largest
total effect on retention equal to 0.799. The analysis of the model showed that unmet financial need is a significant predictor of retention. The direct, indirect and total effects of all variables in the model are presented in Table 13.
Table 13 Unstandardized Direct and Indirect Effects on Retention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Direct Effect</th>
<th>Indirect Effect</th>
<th>Total Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>*Black/African American</td>
<td>0</td>
<td>-0.16</td>
<td>-0.16</td>
</tr>
<tr>
<td>*Other Ethnicity/Unknown</td>
<td>0</td>
<td>0.02</td>
<td>0.02</td>
</tr>
<tr>
<td>Age</td>
<td>0</td>
<td>0.118</td>
<td>0.118</td>
</tr>
<tr>
<td>GPA</td>
<td>0.335</td>
<td>0</td>
<td>0.335</td>
</tr>
<tr>
<td>**Certificate/Diploma as Goal</td>
<td>0</td>
<td>0.053</td>
<td>0.053</td>
</tr>
<tr>
<td>**Transfer as Goal</td>
<td>0</td>
<td>0.012</td>
<td>0.012</td>
</tr>
<tr>
<td>**No Degree as Goal</td>
<td>0</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>***Business Related Majors</td>
<td>0</td>
<td>-0.033</td>
<td>-0.033</td>
</tr>
<tr>
<td>***Computers/Engineering Related Majors</td>
<td>0</td>
<td>0.036</td>
<td>0.036</td>
</tr>
<tr>
<td>***Health Related Majors</td>
<td>0</td>
<td>-0.023</td>
<td>-0.023</td>
</tr>
<tr>
<td>***Other Majors</td>
<td>0</td>
<td>-0.025</td>
<td>-0.025</td>
</tr>
<tr>
<td>Developmental</td>
<td>0</td>
<td>-0.009</td>
<td>-0.009</td>
</tr>
<tr>
<td>Credit Hours</td>
<td>0</td>
<td>-0.006</td>
<td>-0.006</td>
</tr>
<tr>
<td>Level</td>
<td>0.176</td>
<td>0</td>
<td>0.176</td>
</tr>
<tr>
<td>EFC</td>
<td>0</td>
<td>0.154</td>
<td>0.154</td>
</tr>
<tr>
<td>Need Based Grant</td>
<td>0.183</td>
<td>0.119</td>
<td>0.302</td>
</tr>
<tr>
<td>Loan</td>
<td>0.076</td>
<td>0.044</td>
<td>0.12</td>
</tr>
<tr>
<td>LIFE Scholarship</td>
<td>0.436</td>
<td>0.364</td>
<td>0.799</td>
</tr>
<tr>
<td>LTA</td>
<td>0</td>
<td>0.131</td>
<td>0.131</td>
</tr>
<tr>
<td>Unmet Financial Need</td>
<td>-0.034</td>
<td>-0.017</td>
<td>-0.051</td>
</tr>
</tbody>
</table>

*Ethnicity referenced to White/Non-Hispanic
**Goal referenced to associate degree as goal
***Major referenced to associate science majors
Lottery Tuition Assistance

The analysis of the model showed that lottery tuition assistance (LTA) had an indirect effect on retention. The effect was not as strong as other variables in the model. The second research question asked how LTA reduces the unmet financial need of students. 1,189 students received LTA. A review of the descriptive statistics for students who received LTA revealed that 58.9% (699) of students had no reduction in unmet financial need after the addition of LTA. These students had a $0 unmet financial need prior to the addition of LTA. Of the students who received LTA, 23.6% (291) had a reduction in unmet financial need between $501 and $900 and 17.6% (209) of students who received LTA had a reduction in unmet financial need between $1 and $500. For 479 (40.3%) students, LTA was the only form of aid that they received.

For the cohort (n=3,328), only 328 (11.9%) students received more than a $250 reduction in their unmet financial need. The analysis showed that LTA was effective at reducing unmet financial need for only a small percentage of students entering a public two-year college. A majority, 699 (58.8%), of the students receiving LTA had no unmet financial need.

Lottery Tuition Assistance Descriptives

The third research question asked what are the characteristics of students who received lottery tuition assistance? LTA was given to 1,189 (35.7%) students in the cohort. Females made up 50.1% (596) of students who received LTA and males made up 49.9% (593) of students who received LTA. White/non-Hispanics made up 70.3% (836) of students who received LTA and Black/African-Americans made up 22.6% (269) of students who received LTA and Black/African-Americans made up 22.6% (269) of...
students who received LTA. Only 2.1% (25) of students who received LTA were Hispanic, while other ethnicities and unknown made up the balance, 59 (5%), of students receiving LTA. This analysis shows that 40.1% of White/non-Hispanic students received LTA compared to 28.7% of Black/African-American students, 18.9% of Hispanic students and 33.5% of other/unknown ethnicity students. Students between the ages of 16 and 21 made up 58.1% (691) of students who received LTA, while 40.1% (477) of students who received LTA were between the ages of 22 and 54. Only 1.8% (21) of students who received LTA were over the age of 54.

Students with an expected family contribution greater than $25,000 made up 30.8% of students who received LTA, while 8% (95) had an expected family contribution of $0. Students with an expected family contribution between $0 and $12,500 made up 38.9% (463) of students receiving LTA, while 22.3% (265) had an expected family contribution between $12,501 and $25,000. Of the students who received LTA, 26.9% (320) also received a need based grant and 48.5% (577) took out a loan. Students who received a LIFE scholarship were not eligible for LTA.

Summary

This chapter presented the descriptive statistics for the cohort and statistical analysis of the a priori path model for retention at a public two-year college in South Carolina. The a priori model was evaluated using model fit statistics computed in Mplus version 7.11. The model fit statistics were CFI, TLI and RMSEA. A post hoc analysis was performed to determine if improvements could be made to the a priori model. The results of the post hoc analysis indicated that additional paths should be added to the
model. The researcher removed insignificant paths to generate a parsimonious model in the final step. The model fit statistics of the final model indicated that it was a plausible model for predicting retention. Unmet financial need was a predictor of retention and lottery tuition assistance was a predictor of retention through indirect effects. LTA was effective at reducing unmet financial need for only a minority of students in the cohort. The chapter concluded with a description of the characteristics of students who received LTA.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter presents a review of the main points of the study and provides an explanation of the major findings. The implications for policy makers and college administrators are discussed and recommendations for future research are presented.

Summary of Findings

The purpose of this study was to determine if lottery tuition assistance and unmet financial need served as predictors of retention. Retention was defined as students who entered the public two-year college in Fall, 2008 and returned in Fall, 2009. Path analysis techniques were used to evaluate a model of retention and to analyze the relationship between lottery tuition assistance, unmet financial need and retention.

The a priori model was supported by economic and interactional theoretical perspectives. The variables were selected based on prior research and availability in the secondary data source. Demographic, academic and financial variables were utilized in the study. The exogenous demographic variables were (a) gender, (b) ethnicity, and (c) age. The exogenous academic variables were (a) major, (b) level, (c) developmental, (d) goal and (e) credit hours. The exogenous financial variables were (a) expected family contribution, (b) need based grants, (c) LIFE Scholarship, (d) lottery tuition assistance and (e) loans. The endogenous variables were (a) unmet financial need, (b) college grade point average and (c) retention.
Mplus version 7.11 was used to conduct an initial and post hoc analysis of the path model for retention. The model fit statistics indicated a plausible model for retention. Unmet financial need had a significant effect, -.034 (p<0.05), on retention. As unmet financial need increases, the probability that a student will be retained decreases. GPA had a significant effect, .335 (p<0.05), on retention. As GPA increases the probability that a student will be retained increases. All variables in the model had significant paths except for major and goal. Lottery tuition assistance did not have a direct effect on retention, but it did have an indirect effect acting through GPA. The indirect effect of LTA on retention was .131 (p<0.05). The model explained 17.7% of the variance in GPA, 95.1% of the variance in unmet financial need and 28.4% of the variance in retention.

The secondary purpose of the study was to determine how the addition of LTA to the financial aid package reduced unmet financial need and the characteristics of students who received LTA. Descriptive statistics were analyzed to determine how the addition of LTA to a financial aid package reduced the unmet financial need and the characteristics of students who received LTA. A majority, 699 (58.9%) of students (n=1,189) who received LTA did not have unmet financial need and therefore had no reduction in unmet financial need. Only 6.3% (209) of the cohort (n=3,328) had between a $1 and $500 reduction in unmet financial need due to LTA, while 8.7% (291) of the cohort had between a $501 and $900 reduction in unmet financial need. The review found that only 500 (15.0%), students in the cohort (n=3,328) had any reduction in their unmet financial need due to lottery tuition assistance.
35.7% (1,189) of the cohort (n=3,328) received lottery tuition assistance. An examination of students (n=1,189) who received LTA revealed that females made up 50.1% (596) of students who received LTA, while males were 49.9% (593) of the students who received LTA. White/non-Hispanics were the largest ethnicity of students, 70.3% (836), who received LTA, while Black/African-Americans made up 22.6% (269) of students who received LTA. Hispanics made up 2.1% (25) of students who received LTA. The balance was comprised of other/unknown ethnicities. An examination of all students in the cohort (n=3,328) revealed that of all White/non-Hispanic students in the cohort, 40.1% received LTA, while 28.7% of all Black/African-American students received LTA. Only 18.9% of all Hispanic students in the cohort received LTA.

A majority, 58.1% (691), of students (n=1,189) who received LTA were between ages 16 and 21. Students with an EFC between $0 and $12,500 made up 38.9% (463) of students receiving LTA. LTA was the only form of financial aid for 479 (14.4%) students in the cohort. An analysis of the descriptive statistics for students who received LTA showed that recipients were primarily White/non-Hispanic, traditional college age and had an expected family contribution greater than the cost of attendance. LTA was the only form of financial aid received for 40.3% (479) of students that received LTA.

**Conclusions**

This study was conducted to test an a priori model of student retention at a public two-year college in South Carolina. A cohort of students who entered Greenville Technical College in Fall, 2008 and took at least six credit hours was used to test the conceptual model. A secondary database was used to conduct the research into the
relationship between demographic, academic and financial variables and retention. The analysis of the path model of retention and descriptive statistics supported four conclusions.

Conclusion 1: As students’ unmet financial need increases, the likelihood of their retention decreases. This conclusion supported prior research which found that financial need and net price were related to retention (Chen & DesJardins, 2008; Rendon, Dowd, & Nora, 2012; St. John & Starkey, 1995; St. John, 1990). Financial aid is a significant predictor of unmet financial need and when it offsets unmet financial need, it has a positive impact on retention.

Conclusion 2: All forms of financial aid were positively and significantly related to retention. This research study found that receipt of loans increased the probability of retention. Previous research has been mixed on the positive benefits of loans (Cabrera, Nora, & Castaneda, 1993; Chen & DesJardins, 2008; St. John, 1990). This study supports the contention that loans as part of a financial aid package increase the probability of retention at a public two-year college.

Conclusion 3: Lottery tuition assistance only has a minor effect on unmet financial need. A majority of students who received LTA, had an unmet financial need of $0. The largest effect of LTA on retention was an indirect path through GPA. LTA is a unique form of aid that is applied in South Carolina and was proposed for the purpose of reducing the cost of attendance for all South Carolinians (Barnett, 2014). This study found that LTA reduced the unmet financial need for only 15% of the students in the cohort.
Conclusion 4: Lottery tuition assistance was primarily received by White/non-Hispanic students between the ages of 16 and 21 with an expected family contribution greater than $6,250. LTA is a unique form of financial aid that was established in South Carolina to lower the cost to attend a public two-year college. (Barnett, 2014) It is a form of grant aid that is awarded after other forms of financial aid such as Pell Grants and LIFE Scholarship. As such, this research study showed that it provided financial aid to students with greater resources who did not have access to an academic scholarship such as LIFE Scholarship.

Limitations

This study was limited to one public two-year college with a one county service area in South Carolina and as such may not be representative of the entire population of the state especially in regard to underrepresented students. The study was limited by the variables available in the secondary data source and the financial variables selected for study. Lottery tuition assistance is a form of grant aid that is unique to South Carolina in that it is not merit or need based. This unique form of grant aid limits the generalizability of the study to colleges in other states.

Implications and Recommendations for Future Research

Since the early 1900’s, two-year colleges have taken pride in their open access mission (Cohen & Brawer, 2003). Today, nearly half of all undergraduate students in the United States attend a two-year college and the two-year college student body is a diverse student population with more underrepresented students attending two-year colleges than universities. Throughout their history two-year colleges have provided opportunities for
students to learn new skills, develop a vocation or take their first steps toward a bachelor’s degree (American Association of Community Colleges, 2011; Cohen & Brawer, 2003). While the two-year colleges have much to celebrate in their history of open access, it is no longer enough to offer access. Policy makers and college administrators are looking for ways to not only maintain access, but to increase retention and completion rates (College Board Advocacy & Policy Center, 2013; Humphreys, 2012; Long, 2007; Schneider & Yin, 2011).

Two-year colleges are under increasing scrutiny through the proposals for or implementation of performance based funding and the College Completion Agenda. Completion, and by extension retention, is a key measure that is being reviewed to determine the effectiveness of two-year colleges (American Association of Community Colleges, 2011; College Board Advocacy & Policy Center, 2013; Humphreys, 2012; Roman, 2007). The focus on performance based funding and completion is not only a national effort. In South Carolina, Governor Haley has called for implementation of a performance based funding formula for universities, teaching colleges and two-year colleges. She has recommended that the performance measures include graduation rates and job placement (IslandPacket, 2014; Shain, 2012).

The emphasis on retention and completion rates has happened during a time when states have cut funding for two-year colleges, financial aid has shifted to loans and two-year colleges have increased their tuition (American Association of Community Colleges, 2011; Mcleod, 2011; Tollefson, 2009). The state funding changes, federal financial aid shift to loans and tuition increases have increased the unmet financial need for students
(Long, 2007; Long, 2010). Students have identified lack of finances as the top reason that they would withdraw from school (Center for Community College Engagement, 2009).

Performance based funding and the College Completion agenda are bringing together policy makers, educational foundation leaders and college leaders to develop policies that will support student success. Many of these policies are related to student learning and developmental students’ time to completion of degree, but they are also considering financial aid policies (American Association of Community Colleges, 2011; Long, 2008; Schneider & Yin, 2011).

The findings of this study have implications for policy makers and college administrators who are involved in determining effective financial aid policies that improve retention and completion. This study confirmed the relationship between unmet financial need and retention. Additionally, unmet financial need was related to college grade point average which was the strongest predictor of retention in this study. As unmet financial need increases, the probability that a student will have a lower GPA increases and the probability that a student will leave college increases. Lottery tuition assistance could have a larger impact on retention if it offset unmet financial need; however, lottery tuition assistance only had a minor impact on unmet financial need. Lottery tuition assistance could have a much greater impact on retention if it was integrated with need based grant programs that reduced the unmet financial need of more students. The effectiveness of expenditures on financial aid are important because when students leave college, there is a significant cost to the community (Schneider & Yin, 2011).
The cost to the community is important as states consider economic goals and outcomes-based funding systems in how state higher education appropriations are provided to colleges (American Association of State Colleges and Universities State Relations and Policy Analysis Team, 2014). Financial aid policies that do not address unmet financial need may not have the impact that policy makers and college administrators desired when the policies were implemented. Poorly designed financial aid policies could prevent two-year colleges from meeting their performance measures, and prevent students from realizing their dreams. This research study implies that financial aid policy should be grounded in predictive studies that could be used to develop effective financial aid policies.

Lottery tuition assistance was implemented to improve access for students in South Carolina by reducing the cost to attend two-year colleges. The financial aid policies that improve access may not be effective in the retention process. Additionally, the interaction of a financial aid grant that is neither merit nor need based with need based and merit based aid programs is not well understood. The findings from this study encourage policy makers to consider types of financial aid within a system and not as individual components that each impact students individually. The recommendations for future research are intended to build on this study, prior research and encourage further research.

**Recommendations for Future Research**

1. It is recommended that this study be replicated at other two-year colleges in South Carolina that have a different demographic and economic makeup.
2. It is recommended that variables from the secondary database are included with The College Persistence Questionnaire (Davidson, Beck, & Milligan, 2009) in a study that follows incoming students for three years in a longitudinal study. The observed demographic, academic and financial variables could be utilized with the College Persistence Questionnaire to develop a full structural equation model of retention.

3. It is recommended that a mixed method study be designed that would consider the cultural context of underrepresented students.

4. Because lottery tuition assistance is a unique form of financial aid, it is recommended that a study be designed to compare the financial aid policies affecting public two-year colleges in South Carolina to financial aid policies affecting public two-year colleges in other states.

**Conclusion**

Chapter 5 presented a summary of the results of the descriptive predictive study. It included conclusions, limitations and recommendations for future research. This study found that unmet financial need had a negative effect on retention and that lottery tuition assistance had only a minor but significant effect on retention for a 2008 cohort of first time students taking at least 6 credit hours at Greenville Technical College. A majority of students who received lottery tuition did not see a reduction in their unmet financial need and the recipients of lottery tuition assistance were mostly White/non-Hispanic, between the ages of 16 and 21 who had $0 unmet financial need.
REFERENCES

http://act.org/research/policymakers/reports/graduation.html


http://www.aacc.nche.edu/AboutCC/Pages/fastfacts.aspx


Shaw, E. J., Kobrin, J. L., Patterson, B. F., & Mattern, K. D. (2012). The Validity of the SAT for Predicting Cumulative Grade Point Average by College Major. The College Board


