Dave Pelkey for the degree of Doctor of Philosophy in Education presented on April 22, 2011

Title: Factors Supporting Persistence of Academically Underprepared Community College Students

Abstract approved:

____________________________________________________
Jessica E. White

The purpose of this study is to identify factors that support the likelihood of persistence of academically underprepared community college students to 45 college level credits. Factors considered in this research include: (a) race/ethnicity, (b) age, (c) enrollment status, (d) socio-economic status (SES), (e) first quarter GPA, (f) developmental need, (g) participation in a learning community, and (h) completion of a first year seminar course.

The population of students used for the purposes of this research was a cohort of first time, full and part-time, community college students enrolled in associate degree pre-baccalaureate programs of study at Tacoma Community College during Fall quarter 2005. Students in this cohort placed below college level in mathematics, reading or English. Binary logistic regression was used to evaluate the existence, direction and strength of the relationships between each of the independent variables and the dependent variable the completion of 45 college credits.

Findings from this study indicate that enrollment status, specifically full-time enrollment and first quarter GPA, both had statistically significant positive relationships to persistence of academically underprepared students at the community college. Although this research only identifies only two elements as having statistically significant relationships to the completion of 45 credits the data does indicate several other variables with high odds ratios that suggest a possibility that they influence the persistence of
academically underprepared students and should be considered by practitioners at
community colleges.
Factors Supporting Persistence of Academically Underprepared Community College Students

by

Dave Pelkey

A DISSERTATION

submitted to

Oregon State University

In partial fulfillment of

the requirements for the

degree of

Doctor of Philosophy

Presented April 22, 2011

Commencement June 2011
Doctor of Philosophy dissertation of Dave Pelkey presented on April 22, 2011.

APPROVED:

________________________________________________________________________

Major Professor, representing Education

________________________________________________________________________

Dean of the College of Education

________________________________________________________________________

Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

________________________________________________________________________

Dave Pelkey, Author
ACKNOWLEDGEMENTS

I owe a debt of gratitude to those whose encouragement and support made this project possible:

- Dr. Jessica White, my major professor, whose guidance, encouragement and support was a cornerstone of this project;

- The rest of my doctoral committee whose advice and constant support strengthened my research and me personally: Dr. Larry Roper, Dr. Pamela Ralston, Dr. Alex Sanchez and Dr. Terryl Ross;

- CCLP Cohort 15, who made the last four years an enjoyable experience: Flo Bush, Mindy Coslor, Charmagne Ehrenhaus, Dan Findley, Joan Jagodnik, James Mendoza, Jane Ostrander, Samia Yaqub, and Mel Zanjani;

- My friends and colleagues at Tacoma Community College who supported me during this process, in particular, Dr. Tim Stokes and the members of the Institutional Research Office who exhibited true patience and genuine interest in this research;

- William Bailey whose statistical support helped me to better shape my research;

- My wife and best friend Kayleen Oka whose continued patience, encouragement and love was invaluable to this process and enriches my spirit and my life.
DEDICATION

To Loren and Jeanne Pelkey

who modeled the transformative nature of education for me.
TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter One: Focus and Significance</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Purpose and Questions</td>
<td>4</td>
</tr>
<tr>
<td>Personal Disclosure</td>
<td>6</td>
</tr>
<tr>
<td>Significance of Study</td>
<td>7</td>
</tr>
<tr>
<td>Developmental Education: A Current Leadership Challenge</td>
<td>8</td>
</tr>
<tr>
<td>Low Persistence Rate of Academically Underprepared Students</td>
<td>9</td>
</tr>
<tr>
<td>Developmental Education: A Gateway to College for Students of Color</td>
<td>10</td>
</tr>
<tr>
<td>Financial Impact of Persistence</td>
<td>11</td>
</tr>
<tr>
<td>Need for More Research</td>
<td>12</td>
</tr>
<tr>
<td>Summary</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter Two: Literature Review</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach to Review of Literature</td>
<td>15</td>
</tr>
<tr>
<td>Organization of Review of Literature</td>
<td>16</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>16</td>
</tr>
<tr>
<td>Historical Context of Academically Underprepared Students in Higher Education</td>
<td>18</td>
</tr>
<tr>
<td>Characteristics of Underprepared Students</td>
<td>22</td>
</tr>
<tr>
<td>Demographic Characteristics</td>
<td>22</td>
</tr>
<tr>
<td>Academic Profile and Enrollment Status</td>
<td>24</td>
</tr>
<tr>
<td>Noncognitive Characteristics</td>
<td>25</td>
</tr>
<tr>
<td>Scope of Developmental Education Needs</td>
<td>26</td>
</tr>
<tr>
<td>Student Persistence</td>
<td>29</td>
</tr>
<tr>
<td>Underprepared Student Attrition</td>
<td>35</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS (Continued)

<table>
<thead>
<tr>
<th>Strate<strong>gy</strong>s for Increasing Persistence of Academically Underprepared Students</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructional Strategies</td>
<td>39</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>40</td>
</tr>
<tr>
<td>Learning Communities</td>
<td>42</td>
</tr>
<tr>
<td>Institutional Strategies</td>
<td>47</td>
</tr>
<tr>
<td>Commitment to Developmental Education</td>
<td>47</td>
</tr>
<tr>
<td>Develop a Culture of Evidence</td>
<td>50</td>
</tr>
<tr>
<td>Summary</td>
<td>52</td>
</tr>
</tbody>
</table>

## CHAPTER THREE: DESIGN OF STUDY. .................................................................57

<table>
<thead>
<tr>
<th>Philosophical Approach</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assumptions about the Nature of Truth.</td>
<td>59</td>
</tr>
<tr>
<td>Research Methodology</td>
<td>62</td>
</tr>
<tr>
<td>Research Design</td>
<td>62</td>
</tr>
<tr>
<td>Site Selection</td>
<td>63</td>
</tr>
<tr>
<td>Population</td>
<td>63</td>
</tr>
<tr>
<td>Data Collection Techniques</td>
<td>64</td>
</tr>
<tr>
<td>Data Analysis Strategy: Logistic Regression</td>
<td>64</td>
</tr>
<tr>
<td>Coding for Logistic Regression</td>
<td>68</td>
</tr>
<tr>
<td>Summary</td>
<td>71</td>
</tr>
</tbody>
</table>

## CHAPTER FOUR: RESULTS. ...........................................................................72

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>73</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS (Continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Descriptive Data</td>
<td>73</td>
</tr>
<tr>
<td>Inferential Data</td>
<td>77</td>
</tr>
<tr>
<td>Results</td>
<td>79</td>
</tr>
<tr>
<td>Summary</td>
<td>89</td>
</tr>
<tr>
<td>CHAPTER FIVE: DISCUSSION OF FINDINGS</td>
<td>92</td>
</tr>
<tr>
<td>Factors with Relationships to Student Persistence</td>
<td>93</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td>93</td>
</tr>
<tr>
<td>First Quarter GPA</td>
<td>94</td>
</tr>
<tr>
<td>Other Factors</td>
<td>96</td>
</tr>
<tr>
<td>Developmental Level</td>
<td>96</td>
</tr>
<tr>
<td>Demographic Data</td>
<td>97</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>99</td>
</tr>
<tr>
<td>Learning Communities</td>
<td>100</td>
</tr>
<tr>
<td>Study Limitations</td>
<td>101</td>
</tr>
<tr>
<td>Implications for Practice</td>
<td>102</td>
</tr>
<tr>
<td>Areas for Future Research</td>
<td>108</td>
</tr>
<tr>
<td>Conclusion</td>
<td>112</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>115</td>
</tr>
</tbody>
</table>
List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Percentage of Each Ethnic Group Seriously Academically Underprepared.</td>
<td>11</td>
</tr>
<tr>
<td>2: Education Pays.</td>
<td>13</td>
</tr>
<tr>
<td>3: Developmental Education Needs for 2002 Achieving the Dream Cohort by Ethnicity.</td>
<td>27</td>
</tr>
<tr>
<td>4: Bean and Metzner’s 1985 Theoretical Model of College Withdrawal</td>
<td>32</td>
</tr>
<tr>
<td>5: Tinto’s 1993 Theoretical Model of College Withdrawal</td>
<td>33</td>
</tr>
<tr>
<td>6: Students with No Developmental Need</td>
<td>37</td>
</tr>
<tr>
<td>7: Students with High Developmental Need</td>
<td>37</td>
</tr>
<tr>
<td>8: Percentage of 2002 Achieving the Dream Cohort of Students with Developmental Education Needs Persisting to Second Term</td>
<td>38</td>
</tr>
<tr>
<td>9: Data Coding</td>
<td>69</td>
</tr>
</tbody>
</table>
List of Tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Sample Distribution Frequencies</td>
<td>74</td>
</tr>
<tr>
<td>2: Logistic Regression Results Developmental Level</td>
<td>79</td>
</tr>
<tr>
<td>3: Logistic Regression Results Gender</td>
<td>80</td>
</tr>
<tr>
<td>4: Logistic Regression Results Age</td>
<td>81</td>
</tr>
<tr>
<td>5: Logistic Regression Results Race</td>
<td>82</td>
</tr>
<tr>
<td>6: Logistic Regression Results First Quarter Enrollment Status</td>
<td>83</td>
</tr>
<tr>
<td>7: Logistic Regression Results Socioeconomic Status</td>
<td>84</td>
</tr>
<tr>
<td>8: Logistic Regression Results First Quarter GPA</td>
<td>85</td>
</tr>
<tr>
<td>9: Logistic Regression Results Completion of Freshman Seminar</td>
<td>86</td>
</tr>
<tr>
<td>10: Logistic Regression Results Learning Community Participation</td>
<td>87</td>
</tr>
<tr>
<td>11: Logistic Regression Results Entire Model</td>
<td>88</td>
</tr>
</tbody>
</table>
Chapter 1: Focus and Significance

The global economy of the twenty-first century is a complex fabric made up of a globalized marketplace of products and talent, rapidly changing technology, and significant demographic changes. This is the foundation of an information-based and technologically advanced workplace that while requiring constantly changing and advance levels of education, offers a growing number of jobs with the potential to bring prosperity to thousands of Americans (Jenkins, 2002). In the global economy, educational level is directly linked to earning potential. Unfortunately, there are millions of individuals in the United States who lack the educational level that provides them access to the twenty-first century workplace. The 2000 United States Census the government reported more than 34 million adults over the age of 18 lacked a high school education (McCabe, 2000). According to McCabe 42% of all students who complete high school do not have the required skills to begin college level work.

Demographic changes only further complicate the problem. Predictions suggest that over the next 20 years the population in the United States will become more economically and racially diverse (McCabe, 2000). This demographic shift is a key factor in the future of our nation due to the educational disparities that exist in the United States. For example, Kelly (2005) identifies significant disparities in the educational attainment between Whites and most minority groups citing that between 1990 and 2000 40% of the White population ages 25-64 had an Associate Degree or higher, compared to only 15%
of the Hispanic population. This has significant impact on the national landscape due to the fact that most of the future growth in the population is predicted to occur in those populations that are the least educated and have limited access to postsecondary education (Kelly, 2005).

For thousands of students each year, community colleges represent a critical pathway to furthering their education and entering the knowledge-based, technology-driven workforce of the twenty-first century. Unfortunately, 58% of those students entering postsecondary education are not prepared for college level work and over half of these students never complete a certificate or degree (McCabe, 2000).

Underprepared students often begin their college education by enrolling in developmental education courses designed to fill academic gaps and prepare them for college level courses. Of those underprepared students entering community colleges, research suggests that minority students and students from low socioeconomic income levels are more likely to need developmental education courses prior to advancing to college level work (McCabe, 2000). This data indicates community colleges will continue to face significant numbers of academically underprepared students applying for admission.

The challenge facing community colleges goes beyond creating access for increased number of underprepared students. A critical challenge is how to increase the persistence of underprepared students entering community colleges. Literature consistently identifies academic integration, social integration, gender, precollege performance, ethnicity, and financial and socioeconomic status as predictors of persistence or, inversely, contributors to attrition (Bean & Metzner, 1985; Pascarella &
Terenzini, 1983; Spann, 1990; Stage, 1988; Tinto, 1975). Currently, one of the predictors of attrition for community college students is the number of developmental courses a student is required to take prior to advancing to college level work (Adelman, 1998). Research suggests that students enrolled in developmental education are at risk of being left behind in a growing service and technology based economy (Bailey & Alfonso, 2005; Boylan, 1999; McCabe, 2000; McCabe & Day, 1998). For example recent research indicates that only 17% of community college students who enroll in a developmental reading course receive a bachelor’s degree within eight years compared to 58% of students who take no developmental education courses. Adelman (2006) also found that community colleges serving large numbers of low income and minority students reported that only 8.5% of those referred to developmental education courses completed any degree or certificate within four years. This is echoed by McCabe (2000) who reviewed the findings of the National Study of Community College Remedial Education that found that only 43% of students referred to developmental education completed their program. These trends are the reason community college leaders have identified developmental education and meeting the needs of academically underprepared students as one of the critical issues facing community colleges and ultimately, our country.

One of the proposed ways this challenge can be examined is by using college enrollment data to examine student progression in developmental education courses, college level courses and ultimately certificate or degree attainment. By examining this data, colleges can identify the effect of intermediate attainments or momentum points such as the completion of a college success course, participation in a learning community, or completion of 30 to 45 college credits and their association with a higher
probability of success (Jenkins, 2008). Examining student data also helps colleges develop a culture of evidence about specific strategies that can help improve student persistence or identify barriers that may be causes of student attrition. The focus of this research is to identify factors that may have a relationship to increasing the likelihood of the persistence of academically underprepared community college students.

**Research Purpose and Questions**

The purpose of this study is to identify factors that support the likelihood of persistence of academically underprepared community college students to 45 college level credits. Factors considered in this research include: (a) race/ethnicity, (b) age, (c) enrollment status, (d) socio-economic status (SES), (e) first quarter GPA, (f) developmental need, (g) participation in a learning community, and (h) completion of a first year seminar course. The completion of 45 college level credits is significant as it represents the half-way point toward degree completion as well as allows for the conferrence of many of the certificates within the community college system. Community and technical colleges in Washington state where this research was conducted are on the quarter system so 45 credits is the equivalent of two full time semesters or 30 credits in semester systems. Research also suggests that once a student builds academic momentum (in this research defined as the completion of 45 credits) the likelihood of a student dropping out is significantly reduced (Seppanen, 2007). With this purpose in mind, the research will address the following research questions:

1. **What is the relationship between entering college two or more levels below college level and persistence to 45 college level credits?** Consideration of this as a factor will provide data on how many underprepared students successfully
persist to 45 college level credits. This information serves as a foundation for the investigation into factors that support persistence.

2. **What is the relationship between demographic variables (gender, age, race/ethnicity, and socio-economic status) among academically underprepared students who persist to 45 college level credits?** The answer to this question will provide additional and more thorough information on the role that demographic factors play when examining their relationship with the likelihood of persistence.

3. **What is the relationship between first quarter GPA and the persistence of academically underprepared students to 45 college level credits?** Evaluation of first quarter GPA as an indicator of persistence will provide colleges an indicator that may prove to be effective in considering targeted interventions designed to increase persistence.

4. **What is the relationship between the successful completion of a first year seminar and the persistence of academically underprepared students to 45 college level credits?** The evaluation of successful completion of a college success course as a predictor of persistence will provide information on whether this is an effective strategy for colleges to consider for increasing persistence of underprepared students.

5. **What is the relationship between participation in a learning community and the persistence of academically underprepared students to 45 college level credits?** The evaluation of participation in a learning community as a predictor of persistence will provide information on whether this is an effective strategy
for colleges to consider for increasing persistence of underprepared students.

**Personal Disclosure**

This research resonates for me personally for two main reasons. The first of these is the fact that I believe this research has the possibility to help marginalized students be successful. I have always maintained a strong commitment to support those students who may struggle to attain their education. I have a personal belief that true access to education goes beyond just the ability to enroll in a community college or university. True access means that colleges and universities must be committed to access as the first step toward student success. For thousands of students access means completing developmental courses before beginning college level coursework. For these academically underprepared students developmental education represents a gateway to education, but for those students who are not persisting this process may represent a gatekeeper or barrier to their education. By conducting research that examines developmental level, demographic variables, GPA, completion of first year seminar and participation in a learning community and their possible relationship to persistence of academically underprepared students colleges may be better equipped to truly provide access to education that goes beyond just their front door and is the first step to student success.

The second reason this research appeals to me is because it has the potential to help develop a culture of evidence that will allow colleges to make data-informed decisions that will help to establish true gateways to education for underprepared students. During the past 20 years that I have spent working in community colleges it has become apparent to me that colleges and students struggle to attain their goals. Students
struggle to balance school, work and other personal needs, while colleges struggle to fiscally balance the multiple needs of the institution and its students. This research supports both challenges. It provides data that will help colleges consider relationships between underprepared students and institutional strategies that may increase the likelihood of persistence, thus helping colleges make data-informed systems based decisions affecting both the college and student success.

**Significance of Study**

The success of underprepared students has both practical and scholarly significance to community colleges and society. Research that reveals a better understanding of factors that may increase the likelihood of persistence of underprepared students at community colleges is significant because: (a) current community college leadership identifies developmental education as a significant issue; (b) there is a low persistence rate of underprepared students who must take developmental courses; (c) developmental education is a gateway to college for many students, including students of color and students from low socioeconomic backgrounds; (d) there is significant financial impact of developmental education for students, institutions and society; and (e) there is a need for more research in this area in order to successfully close the achievement gaps and prepare all students to successfully enter the workforce.

According to the National Center for Educational Statistics (2003a), 98% of all US community colleges offer developmental education courses for underprepared students. NCES further reports that of the 992,000 entering freshmen at community colleges in the fall of 2000, 42% enrolled in at least one developmental education course (2003b). It is estimated that more than two million students each year would drop out of
postsecondary education without participation in one or more developmental education activities (McCabe & Day, 1998). These statistics clearly illustrate the pathway that community colleges provide for underprepared students as they work to create future occupational and educational opportunities for themselves.

**Developmental education: A current leadership challenge.** Community college leaders from across the country are struggling with how to effectively meet the needs of the high numbers of underprepared students enrolling in community colleges. Current research states that over one million underprepared students enter community colleges every year (McCabe, 2003). Recently, a report published by the Lumina Foundation identified improving the effectiveness of developmental education as the most important issue confronting community college leaders (Bailey & Alfonso, 2005). This is echoed by the Community College Futures Assembly, which stated that the challenges and opportunities associated with increasing numbers of underprepared students is a major concern for community college leaders (Campbell & Williams, 2005).

Developing underprepared students is gaining more national focus and has been the topic of a growing amount of research. Hunter Boylan (n.d.), Director of the National Center for Developmental Education, suggests that with the help of developmental programs, underprepared students can pass courses and graduate at rates equal to those of better prepared students. Without this help, large numbers of potentially successful students would be unable to complete college. Other organizations, including the American Association of Community Colleges and the League for Innovation of Community Colleges, are also recognizing the need for community colleges to focus on the success of underprepared students. In 2001, the Lumina Foundation launched
Achieving the Dream, a multiyear national initiative to help more community college students succeed. The initiative is particularly concerned with student groups that traditionally have faced significant barriers to success, including students of color and low-income students. Membership of these organizations represents the leadership of today’s community colleges and agrees on the need to consider ways to increase the persistence of the underprepared students entering community colleges.

**Low persistence rate of academically underprepared students.** Another challenge facing community colleges is the lack of persistence of underprepared students. Research clearly identifies that for academically underprepared students developmental courses are a critical pathway for students to reach college level courses. However a recent study found that only 27% of students enrolled in developmental education completed their courses (Dream, 2004). Even if students do complete an initial developmental course those needing multiple levels of developmental work are still at risk of dropping out. Research demonstrates that one of the strongest predictors of attrition is the number of developmental courses a student is required to take (Adelman, 2006; Hawley & Harris, 2005). These indicators suggest that significant numbers of underprepared students enrolled in developmental education do not persist to college level courses and ultimately to a certificate or degree.

In order to persist toward a degree or certificate, underprepared students must successfully complete developmental courses to prepare them for college level curriculum. The requirement that students successfully pass a course in order to enroll in the next level courses means that these courses are curricular gateways or prerequisite courses (Adelman, 2006) to continuing a student’s college education.
However, prerequisite or gateway courses that enroll large numbers of students, have low pass rates, and tend to be first-year courses become barriers or “gatekeeping” courses for underprepared students. Simply stated, developmental education courses at community colleges represent gateways that underprepared students must pass through in order to continue their education, but the low persistence rates of students in these courses suggest that developmental education can be a barrier or gatekeeper for many students.

**Developmental education as a gateway to college for students of color and low socioeconomic backgrounds.** Of those underprepared students entering community colleges racial /ethnic minority students represent two thirds of those involved in developmental education and students from lower socio-economic backgrounds are also more likely to enroll in developmental education (McCabe, 2000). Another factor that affects the significance of this issue is the predicted change in the demography of the United States. It is predicted that by 2050 the nation will be nearly half racial/ethnic minorities (R. McCabe, 2000). This shift will be the most prevalent among youth. If community colleges are committed to closing the educational gap that exists between minority and majority students, shifting developmental education classes from gatekeeping or barriers to gateways to college level courses is essential. Current research shows that while only 5% of white non-Hispanics were seriously underprepared (i.e. underprepared in reading, writing, or mathematics and assigned to developmental course in two or more areas) minorities were significantly higher (see Figure 1). On average 20% of minority students in all categories are seriously underprepared (McCabe, 2000). These figures suggest that effective developmental education is necessary to achieve
educational equity and close the educational achievement gap that exists in the United States.

*Figure 1. Percentage of Each Ethnic Group Seriously Academically Underprepared*

![Bar Chart showing percentage of each ethnic group seriously academically underprepared](image)


**Financial impact of developmental education.** One of the barriers faced by community colleges to providing developmental education is cost (Saxon & Boylan, 1999). Currently, community colleges invest over one billion dollars per year in developmental education in order to increase the likelihood that underprepared students will gain the skills they lack and persist to gain a certificate or degree (Kolajo, 2004).

One of the strongest voices against developmental education comes from taxpayers, who believe that developmental education represents the duplication of effort and cost (Boylan, Saxon, & Link, 2000). They assert that students should have gained these skills during their high school education. The cost of not supporting developmental education at the community college level however, has significant impacts in other areas.
A recent study determined that if one-third of the students taking at least one remedial course were to earn a bachelor’s degree, they would generate more than $74 billion in federal taxes and $13 billion in state and local taxes, while costing the taxpayer about one billion dollars to remediate (M. G. Spann, Jr., 2000). Currently, developmental education programs serve one million students per year and about half that number successfully completes developmental courses and continue in college level courses. This costs only 1% of the national higher education budget and 4% of the federal financial aid budget (McCabe, 2003). The graduation rate for remedial students would have to drop below the 1% level before taxpayers would see a loss on their investment (M. G. Spann, 2000).

In our global economy educational level is directly linked to earning potential. Statistics from the Department of Labor Statistics (2008) shown in Figure 2 clearly indicate that higher educational levels increase average weekly earnings and reduce unemployment rates.

Clearly taxpayers are not the only ones to benefit from increasing the persistence of underprepared students, colleges and society in general benefit as well. The retention of students at community colleges has a significant positive financial impact on a college’s budget as well as the financial stability of individual students and the country.

**Need for more research.** Grubb (2001) suggests that we do not know if developmental education really works due to the lack of research. He points out that existing evaluation methods of developmental education fail because evaluators/institutions do not know what the program really does. This is echoed by
Levin and Calcagno (2008) who state that relevant literature has very little evidence of effectiveness of developmental education practices and their effect on persistence. This is important as literature suggests that we know more about our students before they enter and after they leave than we do when they are at the college (Attinasi, 1991). Statements like these illuminate a need for research that not only looks at program components, but also improves information about many perspectives and outcomes of developmental education programs that serve academically underprepared students (Grubb, 2001). This research will add to the current body of research by identifying possible relationships between factors that may increase the likelihood of persistence of academically underprepared community college students.
Summary

Today’s community colleges are experiencing the convergence of several forces that are making increased persistence of academically underprepared students critical to their missions. The significant number of underprepared students, rising demand for a knowledge-based workforce, poor persistence rates of underprepared students, and the current achievement gap between minority and non-minority students suggest the need for change. In order to identify strategies to increase persistence and support educational equity, it is necessary to better understand the factors that may increase the likelihood of persistence of academically underprepared students at community colleges. Research that both considers strategies that show promise for increasing persistence and creates data that colleges can use to improve student success is essential for students, colleges and the nation.
Chapter 2: Review of Literature

The purpose of this review of literature is to identify and evaluate current academic research focused on factors that increase persistence of underprepared students at community colleges. The specific question guiding the review of literature is: What does current literature indicate about the factors that support the persistence of academically underprepared students at community colleges? This question and the review of identified research will also inform the design of the proposed study.

Approach to the Review of Literature

The Oregon State University Research Database and the University of Washington library were used in searching for the literature used in this study. Primary search sources included EBSCO host, Education Resources Information Center (ERIC) and Electronic Journals Service (EJS). Primary focus was given to quantitative and qualitative research in the United States, research done specifically at community colleges, and from peer reviewed journals located in a variety of categories of higher education literature. While scholarly journals provided a primary source of information, dissertations as well as several books were also included in this research. Relevant research dated within the last 10 years was the predominant time frame considered for inclusion in this study.

For the purposes of this research several key word search methods were used to search databases including: (a) developmental education, (b) student persistence, (c) learning communities, and (d) freshman seminars. While these were the main themes used to search for research it was not limited to these words or concepts.
Organization of the Review of Literature

Persistence of academically underprepared students at community colleges is a critical and complex issue facing college leaders, yet there is a demonstrated lack of current research specifically focused on factors affecting these students. The research reviewed for this study includes these areas: (a) the historical foundations of developmental education; (b) characteristics of students enrolled in developmental education; (c) what is known about student persistence; and (d) current strategies that show promise for increasing the success of underprepared students.

Definition of Terms

The following terms have been identified as important to the context of this research and have been defined as follows.

*Academically underprepared*: assigned to developmental courses in one academic area. (McCabe 2000).

*Academically underprepared student*: any student as identified by a college placement examination to be academically underprepared in one or more of the basic skills areas including reading, writing, or mathematics (College Bound 2001).

*Community college*: a public, two year institution granting Associate degrees and certificates. Community college is identical to community junior college, junior college and two-year college (Roueche & Kirk, 1973).

*Developmental education*: an organized collection of courses and/or services designed to help underprepared students succeed (Boylan, 2002, p. 3).

*First year seminar*: First year seminars, freshman seminars, or college success courses are courses for entering students that are designed to help students transition to and
engage in the college environment and ultimately increase the chances that students will be successful (Barefoot & South Carolina Univ, 1993; Tinto, 1993).

Learning Communities: any one of a variety of curricular structures that link together several existing courses, or restructure curriculum in a manner that creates opportunities for students to gain deeper understanding and integration of the course material; and more interaction with instructors and fellow students as active participants in the learning process (Gabelnick, MacGregor, Matthews, & Smith, 1990).

Momentum Points: measurable educational attainments, such as completing a developmental math or English course, English 101, or the completion of 15 or 30 credits. Momentum points lead to milestones such as completion of developmental requirements, certificate or degree completion and transferring to a baccalaureate program (Lienbach and Jenkins 2008).

Persistence: the continuing enrollment status of students from quarter to quarter (excluding summer quarter) and year to year. For the purposes of this research this is being narrowly defined as the persistence to 45 college level credits.

Remedial Education: is an outdated term interchanged with developmental education, at risk, high risk and is used to describe programs or courses that enhance the basic skills of entry level students who enroll in and benefit from the content in order to prepare for college level instruction (Roueche and Roueche, 1999).

Seriously academically underprepared: a student who is assigned to developmental courses in two or more academic areas. (McCabe 2000).

Student Involvement: the psychological energy or commitment to an activity or project and the time dedicated to an activity (Austin, 1984).
Historical Context of Academically Underprepared Students in Higher Education

This section of the literature is meant to provide a brief overview of the historical context of the response of higher education to academically underprepared students. It will demonstrate that serving the needs of students entering college not prepared to successfully complete college level work has been a challenge for community colleges since their inception. It will begin with the needs of students in the nineteenth century and progress to the present, touching on key events illustrating the growth of developmental education at community colleges.

History suggests that colleges have always been faced with serving academically underprepared students, and the need for developmental education is not new to colleges or universities. It also demonstrates that developmental education has been a leadership challenge since its inception. As college enrollments grew so did the needs of the diverse population that colleges served. An examination of the historical growth of developmental education will provide a foundation from which the current challenges within developmental education at community colleges will be examined.

The enrollment of underprepared students, or students not prepared to be successful in college level courses, at colleges and universities is not a recent phenomenon. Developmental education existed as early as 1871 when Charles Elliot, the president of Harvard, identified the need for extra assistance to prepare students for college level classes. He specifically cited that students were lacking the ability to spell, write well and use proper punctuation. As a result, Harvard developed an entrance exam and by 1879, 50% of the applicants were conditionally admitted, causing the university to provide extra assistance to prepare students for college level courses (Casazza, 1999).
During this time many other colleges were also experiencing the same lack of student readiness and the addition of preparatory courses often led to a six year course of study for underprepared students (Casazza, 1999).

In 1862 and 1890 with the passage of the Morrill Act, colleges began to see a broader range of students than ever before. The first legislation established funding for the creation of schools focused on teaching agriculture and mechanics. The second legislation prohibited federal funding to states where discrimination still existed. This legislation increased access for both students of color and students from traditionally lower socioeconomic levels. During this period business leaders also began to exert pressure on higher education stressing the need for education to focus more on the needs of business and less on its current classical and literary emphasis (Casazza & Silverman, 1996). This growth in enrollment both of traditional students and students of color brought with it an increased need to serve those students not ready to succeed in college level courses or developmental students.

At the turn of the century, colleges and universities began offering developmental courses, commonly labeled as remedial or study skills courses. By 1909, over 350 colleges and universities were offering courses in study skills for students the college determined to be underprepared. A survey of state universities done in 1929 found that 25% of respondents tried to identify students with poor reading ability on admission, and slightly less reported providing remediation (Casazza, 1999). At this time, many colleges began granting credit for developmental courses. Also colleges and universities developed a variety of organizational structures and course titles. Some colleges, realizing the negative impact on students, began to drop the term remedial. “Harvard
reports that when they changed the name from Remedial Reading to The Reading Course their enrollment went from 30 to over 100 students from all over the institution” (Wyatt, 1992, p. 37).

With the progression of the twentieth century, the end of World War II, and the passage of the GI Bill, colleges experienced the enrollment of over one million veterans needing support services and further academic preparation in order to be successful (Wyatt, 1992). The GI bill also provided colleges with funds to develop tutoring services, study skills programs, and advising centers. These support systems grew and became more comprehensive in order to meet the needs of the diverse needs of new students entering college (Casazza, 1999). Colleges now began to view students more holistically, meeting needs both in and out of the classroom.

This more holistic view also brought an emerging shift in terminology. What had been seen as remedial education and focused on fixing a deficit that existed in a student’s academic abilities, now began to be seen as developmental, or a “comprehensive process which focuses on the intellectual, social, and emotional growth and development of learners” (Casazza, 1999, p. 4).

As colleges and universities entered the 1970s it is estimated that 99% of all community colleges had developmental courses (Cohen & Brawer, 1991). Another study conducted in 1979 found that three in eight English classes were conducted at below college level, and one in three mathematics classes were taught at a level lower than college algebra (Cohen & Brawer, 1991).

In the 1970s colleges saw the emergence of another group of students who needed the assistance of developmental education. These were first-generation students who
represented the first in their family to enroll in higher education. In many cases these students believed that education was the key to a better job and a better life than their parents had been afforded. Unfortunately, many first-generation students typically scored in the bottom third on traditional tests of academic ability (Cross, 1971).

By the 1990s, colleges experienced continued growth in the numbers of both nontraditional and underprepared students and began to increase efforts to provide more support for these populations. Students in today’s colleges are even more diverse in many ways than the students that enrolled in the early 1990s. They come from more diverse cultural backgrounds, they come from homes where English is not the primary language, and they have more diagnosed learning disabilities than ever before. Significant numbers of new students are adults who are returning to college after varying periods of time (Casazza, 1999).

Currently, “half of entering community college students are academically underprepared” (McCabe, 2003, p. 22). With the growing need for developmental education, research in this area represents a key component in both the success of our students and the development of a knowledge-based global workforce for the future. This examination of the historical growth of developmental education in colleges demonstrates that underprepared students have been enrolling at colleges and universities since their inception. It also shows that meeting the needs of underprepared students has historically been a challenge for college leadership. From the students’ perspective, developmental education historically has served as a gateway to higher education and a key to entering the workforce and a better life for themselves and their families.
This historical perspective supports the purpose of this research by demonstrating that community colleges have continually struggled with an increase in underprepared students, and how to effectively meet the needs of this population. Research on how to help underprepared students persist and succeed is essential for today’s community colleges. Creating a strong research driven body of evidence that identifies effective strategies has significant benefit to students, colleges, and the United States.

**Characteristics of Underprepared Students**

In order to understand the experience of underprepared students enrolled in developmental education at community colleges, it is important to examine the characteristics of these students. Such understanding of who students are supports the development of a deeper understanding of the barriers to persistence faced by students and may play a role in selecting the appropriate strategy to remove the barriers and increase persistence. This section will examine the characteristics of students enrolled in developmental education at community colleges as articulated in the literature.

**Demographic characteristics.** There is very little current research that clearly identifies demographic information at a national level about students in developmental education specifically. Much of the research that is done on underprepared students enrolled in developmental education varies in the scope and size, and few address gender or other demographic variables. Those studies that do address gender report that females account for over half of students needing remediation (Boylan, Bonham, & Bliss, 1994; Knopp, 1996). According to one national study, the average age of developmental students is 23 (Boylan, Bonham, & Bliss, 1994). Research further states that 59% of
students reported in developmental education were under the age of 24, 24% were between the ages of 25 and 34 and 17% were over the age of 35 (Knopp, 1996).

Not surprisingly, according to Boylan, Bonham and Bliss (1994), in 1993 the majority (67%) of students enrolled in developmental education were White. African Americans represented 23% and Hispanic students were 6% of the developmental education population, while Asians represented 3% and Native Americans represented 1% of the population. What is important to note about these statistics is that in this study racial/ethnic minorities represented about 9% of America’s college students at this time, but accounted for 23% of the developmental population clearly indicating that racial/ethnic minorities are over represented in developmental education programs (Boylan, Bonham, & Bliss, 1994). Further research that identifies academically underprepared students as either underprepared (assigned to developmental courses in one academic area) or seriously underprepared (assigned to developmental courses in two or more academic areas) found that over three quarters of seriously underprepared students were racial/ethnic minorities (McCabe, 2000). This research also indicated that racial/ethnic minority women represented 51% of all seriously underprepared students.

The literature also suggests that significant numbers of developmental students at community colleges are the first in their family to attend college (Roueche & Roueche, 1999). One study that focused specifically on developmental mathematics students concluded that the older the student, the smaller the likelihood that their parents had a college education (Umoh & Eddy, 1994). Research that was done on specifically first-generation college students reported findings similar to research done with developmental students. Inman and Mayes (1999) reported that first-generation students typically came
from poor families, were more likely to be female and older, but had the ability to succeed in college equal to that of second and third generation college students.

Another finding from the literature is that over half of financially independent students in developmental education reported yearly incomes of less than $20,000 (Knopp, 1996). While other studies did not present income data, some studies do cite low economic status as a common characteristic of students in developmental education (McCabe & Day, 1998; Roueche & Roueche, 1999). This statistic is not surprising considering the number of students that were under the age of 24.

**Academic profile and enrollment status.** Boylan, Bonham and Bliss’s 1993 national study of entering community college students in developmental education found that the average high school grade point average was 2.4. The same study followed the performance of students participating in community college developmental education during a three and a half year time frame. Students’ college grade point average upon completion or departure was 2.28 (Boylan, Bonham, & Bliss, 1994).

This data does include grades received in college level classes as well as developmental classes, and does not report the dropout rate of students during those first three and a half years. Other research suggests that 50% of remedial students scored below 800 out of a possible 1,600 on the SAT test (Knopp, 1996). Another study suggests that as many as 72% of entering community college students scored below college level in one or more subject areas (McCabe, 2003).

Enrollment status has been defined as either full time or part-time enrollment. Traditionally, students enrolled for 12 or more credits per term are identified as full-time and students enrolled for fewer than 12 credits were identified as part-time (Bean &
Metzner, 1985). Several studies (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993) indicate that the number of credits taken in any one term was related to persistence. Feldman concluded that part-time students were over two times more likely to drop out than full-time students (Feldman, 1993, p. 511).

The data on the enrollment status that focuses specifically on students in developmental education is conflicting. A national study suggested that most of the students enrolled in developmental education were enrolled full time (Boylan, Bonham, & Bliss, 1994), while a local study done in Florida reported that the majority of developmental students enroll part-time (McCabe, nd). Research also identifies that about 40% of community college developmental students received financial aid (Knopp, 1996). Two national studies of students in developmental education at community colleges report that most of the students declare themselves to be degree seeking (Boylan, Bonham, & Bliss, 1994; Knopp, 1996).

**Noncognitive characteristics.** Noncognitive characteristics in the literature refers to the behaviors of developmental students, for example specific study skills or techniques used by students, or student motivation to succeed in college (Young & Ley, 1997). The research available on the noncognitive characteristics of developmental students in community colleges is limited and conflicting. Some of the research available does point out that developmental students are motivated to succeed in college (McCabe, nd) and that they are motivated at the same level as students not needing developmental classes (Ley & Young, 1998a). However, evidence from the Learning and Study Strategies Inventory (Ley & Young, 1998 b) suggests that developmental students used fewer self-regulation strategies such as, self-evaluation, goal setting and planning,
seeking information and seeking assistance. Research further asserts that developmental students used self-regulation strategies less frequently than non-development students (Ley & Young, 1998 b). Thompson (1998) added that in many cases developmental students were uncertain about their specific goals and had low self-efficacy towards some academic tasks.

One limitation to the literature found on noncognitive characteristics is that most studies used a small sample and focused specifically on four-year college students. However, one similarity found between several studies is that developmental students lack the academic ability and critical thinking skills necessary to survive in college without intensive assessment, counseling and other learning assistance services (Reed, Makarem, & Shaughnessy, 1994; Shaughnessy & Moore, 1994; Weinstein, Dierking, Husman, Roska, & Powdrill, 1998).

**Scope of developmental education needs.** In current research done by the Lumina Foundation for the Achieving the Dream (ATD) initiative to increase student success, more than eight out of ten students were referred to developmental education. Thirty seven percent of students were referred to one subject, while 26% were referred to two subjects and 22% were referred to three subjects. This is critical data as other research supports that, the more developmental courses a student is required to take the less likely they are to earn a degree (Adelman, 1998). ATD research also suggests that developmental education needs vary by race/ethnicity. A smaller percentage of White students were referred to three developmental subjects than were other racial and ethnic groups. White students also represented the highest percentage of students that had no need for developmental education (see Figure 3).
The literature that exists about the characteristics of students in developmental education at community colleges is limited and some of the literature that does exist has been focused on students at four-year institutions. Other limitations that exist include small sample size, and in some cases grouping developmental and non-developmental students in the same sample.

The relevant literature about the characteristics of developmental education students suggests that in many ways these students are very much like any other community college student. However, research clearly indicates that of those students entering college with serious academic deficiencies ethnic/racial minorities are over-represented.
Two other factors that differentiate developmental students from non-developmental students are: (a) they have lower scores on institutional entry assessment tests, and (b) the difference in the persistence rates of the two groups. Achieving The Dream research suggests that students with no developmental need persist to degree completion at a rate nearly ten percent higher than those requiring developmental education (Clery, 2006) and that students in developmental education who do not complete courses during the first quarter have the lowest persistence rate.

It is this low rate of persistence that supports the need for more research focused on students in developmental education. The examination of barriers to student persistence is also necessary to increase the success of students of color at community colleges. The recent research shows that the students with the highest risk of not persisting are those students in developmental education during their first term. This suggests that research in developmental education should focus on early intervention and accessing the barriers to students’ persistence during their earliest terms in community college.

The research on the characteristics of underprepared students in developmental education programs clearly identifies critical differences between students needing developmental courses and those who are arriving to colleges prepared for college level work. Most of this research was done at the national level, which does provide a sound set of data. However, it is important for colleges to consider demographic data specific to their own institutions to identify institutional barriers that may exist for groups of students as well as successful strategies that support specifically underprepared students.
Student Persistence

Student persistence to certificate or degree completion or departure from college is one of the most researched areas in higher education (Braxton, 2000; Tinto, 1993). Some of the most cited research in this area include Tinto (1975; 1993), Bean and Metzner (1985), and Pascarella and Terenzini (1983). One of the early models of student departure was created by Spady (1970) who suggested a departure model based on several sociological issues. Spady’s study was based on longitudinal data from 683 first year students attending the University of Chicago in 1965. Spady’s research used multiple regression analysis and identified six statistically significant predictors for departure from school: (a) academic integration, (b) social integration, (c) socioeconomic status, (d) gender, (e) choice of department, and (d) SAT and ACT score. Although all six predictors were identified, Spady indicated that formal academic performance is the dominant factor in student persistence.

This research was followed by Tinto’s (1975) model of student integration in which he expanded Spady’s model to explain how and why students drop out of college. Tinto’s Student Integration Model attempted to explain both the aspects and the process that influenced a student’s decision to leave college. Tinto suggests that students enter higher education with a wide variety of personal characteristics, experiences and commitment to the institution. In this model Tinto identifies the need for students to recognize the cost/benefit or value of their college experience. He also states that “it is the individual’s integration to the social and academic environment that most directly relates to continuance in college” (Tinto, 1975, p. 41).
The concepts of both academic and social integration or involvement are fundamental elements of many of the most cited studies on student persistence (Bean & Metzner, 1985; Pascarella & Terenzini, 1983; Spady, 1970; Tinto, 1975). Tinto (1993) suggests that the greater the students involvement in the life of the college, both social and academic, the greater their acquisition of knowledge and development of skills. Tinto stresses that while both social and academic involvement play essential roles in persistence, the relationship between the two is neither “simple or symmetrical” (Tinto, 1993, p. 131). Some students may persist due to high levels of academic involvement. For others, social interaction may help to provide necessary support and offset an absence of academic interaction. For the purposes of this research the definition of student involvement is defined as the psychological energy or commitment to an activity or project and the time dedicated to an activity (Austin, 1984). Tinto’s model of student departure from college suggests a multidimensional process resulting from interaction between the student and the institution and influenced by the characteristics of both.

Pascarella and Terenzini (1979) integrated both Spady’s (1970) and Tinto’s (1975) research to further study college dropouts. They conducted a longitudinal study at a large independent residential University in New York State. The research population included a simple random sample of 1905 incoming freshmen students. The students were asked to complete a detailed questionnaire designed to assess their college expectations and collect identified background information. Pascarella and Terenzini (1979) indicate three basic purposes of their research: a) to determine the interactive influence of measures of social and academic integration with various measures of entering student characteristics in the prediction of persistence; b) identify interactions
between measures of social integration and measures of academic integration; and c) to identify interactions between student-faculty relationships and various student characteristics and other forms of social and academic integration. The findings of their research support both Spady’s (1970) and Tinto’s (1975) findings that identify the complexity of the influences on student persistence. Pascarella and Terenzini (1979) further support the need for both social and academic integration. They add that what happens to a student during the first year of college may be more important than the student characteristics, aspirations or aptitudes that a student brings to college. Pascarella and Terenzini (1979) also indicate that the frequency and quality of student-faculty relationships have a positive impact on student persistence.

While both Pascarella and Terenzini (1979) and Tinto’s (1975) research are very influential some critics suggest that since the research was conducted at four-year residential institutions it should not be generalized beyond those types of institutions. In order to consider non-traditional students, Bean and Metzner (1985) proposed a model that significantly differed from earlier models (see Figure 4). Bean and Metzner indicated that social integration only had a minimal effect on the persistence of non-traditional students who tended to be older and did not live on a college campus.

They argued that Tinto’s model relied too heavily on social integration to explain student attrition. As a result they proposed a model for the study of the attrition of specifically non-traditional students. In this context a non-traditional student was defined as: “Older than 24, or does not live in a campus residence (e.g., is a commuter), or is a part-time student, or some combination of these three factors, is not greatly influenced by the social environment of the institution, and is chiefly concerned with the institution’s
academic offerings’ (Bean & Metzner, 1985, p. 489). As a result, they developed a model that focused more on interaction with the external environment stressing the importance of variables including finances, hours of employment, outside encouragement, and family responsibilities.

In his book, *Leaving College* (1993) Tinto broadens his original research to include more recent research on non-traditional students at two year institutions and suggests a longitudinal model of institutional departure (see Figure 5).
While this model is similar in structure to his earlier ones, it suggests another explanation of student departure: failure to negotiate the rites of passage. According to this theory, students would be more likely to remain enrolled if they navigate three fundamental stages of transition. The first stage is Separation, during this phase students began to separate themselves in varying degrees from their family and high school friends. Students then enter stage two Transition where they become more actively engaged in a process by which they identify with and take on the values of other students and faculty at the institution. Finally in stage three Integration, students commit themselves to pursuing those values and behaviors that have been demonstrated by peers and faculty.
within the institution. This model also identifies several factors that influence a student’s departure decision such as: (a) pre-entry attributes; (b) goals and commitments; (c) institutional experiences (social and academic); and (d) integration. Tinto recommends that institutions be aware of the stages of transition that a student must go through as well as the factors that influence departure decisions when they consider strategies designed to retain students.

Tinto (1993) suggests that while the development of retention strategies is helpful they cannot replace a high quality, caring and concerned faculty and staff. Any strategies that are developed must focus both on the institution as well as on the student as well as the actions of the faculty and staff. Ultimately, student retention is as much a function of institutional behavior as it is student behavior.

Another factor affecting student persistence is debt load. Research conducted by Cofer and Somers (1999) entitled *Deeper in Debt: The Impact on the 1992 Reauthorization of Student Persistence*, evaluated the impact of debt on a students’ persistence in college. Cofer and Somers found that community college students were 0.57 percent less likely to persist per $1,000 in tuition paid. They also found that students were 6.84 percent more likely to persist for every $1,000 of grants received and 2.45 percent more likely to persist for every $1,000 of student loans received in a single year. Other factors included in their study included students’ previous educational achievement and aspiration, their financial and socioeconomic background, and college experiences.

The literature consistently demonstrates that the two leading predictors of persistence are academic and social engagement. These are followed by gender, pre-college performance and socioeconomic status. While this research represents some of
the leading work on student persistence, almost all of it has been done on students enrolled at four-year universities. Unlike community colleges, most of these universities have residential populations making them very different from two year institutions.

Bailey and Alfonso (2005) suggest that the lack of research focused specifically on the community college presents a serious problem when it comes to the study of retention or persistence. Although Tinto’s (1987) model of institutional departure is one of the most cited models, Tinto himself questioned whether the social integration mechanisms are relevant to commuter and community college students (Tinto, 1993).

In an effort to look specifically at the persistence of entering community college students, research by Karp, Hughes and O’Gara (2008) and Delie-Amen (2005) refute the idea that Tinto’s (1993) integration framework is inapplicable to the study of persistence at community colleges. Karp, Hughes and O’Gara conducted interviews of first year students at two urban community colleges. Their research found that academic and social integration are critical for community college students and that the two forms of integration happen in concert via information networks. Karp, Hughes and O’Gara (2008) define information networks as “social ties that facilitate the transfer of institutional knowledge and procedures” (p.8). They suggest that these information networks help students to learn about and become comfortable with the campus and by doing so support the persistence of community college students.

**Underprepared student attrition.** Within community colleges academic under-preparedness is a significant source of attrition (Roueche & Roueche, 1993). Research done involving community colleges in Texas by Saxon and Boylan (1999) revealed that up to 50% of students enrolled in remedial courses failed to persist. This is supported by
research done by Bailey and Alfonso (2005) that found that almost one fifth of all traditional community college students never complete 10 credits and the number of students not completing is increased for older students. Roueche and Roueche (1993) state that nearly half of entering community college students are academically underprepared yet the majority of community colleges do not have a solid understanding of the problem and even less have implemented strategies to address the issue. McCabe (2000) believes that it is imperative for institutions to assign a high priority to serving the underprepared. “The numbers demand commitment and the society requires it” (p. 22).

The ATD research (2006) supports Adelman’s (1998) findings that students with no need for developmental education cumulatively succeed (persisted, attained degree, or transferred) at a higher rate than those with high developmental education needs (see Figures 6 and 7). One interesting contrast is the number of students who persisted to at least one term in their third year is smaller for those needing no developmental education. This is attributed to the significant differences in degree completion and transfer rates between the two groups. The difference between the students who succeeded and those who did not also varies by race/ethnicity. The difference was less significant for Hispanic students than it was for Black students. One interesting finding is that Native Americans with high developmental education needs succeeded at a higher rate than Native Americans with no need for developmental education (Clery, 2006). While researchers do not offer insights in to the cause of this difference in success rate, they do suggest that more research is needed to gain more insight in to the student experience.

Further research done by ATD (2006) demonstrates that those students who were referred to developmental education, but did not complete the course during the first term
Figures 6 and 7. Students With No Developmental Needs and Students With High Developmental Needs

Students with no developmental education needs*

Students with high developmental education needs**

*Not referred to developmental education in any subjects

**Repeated to developmental education in three subjects


had the lowest second term persistence rate of 57% (see Figure 8). This finding supports research that presents a need for early intervention for first term students in developmental education. Many of these strategies are discussed later in this research.

Ultimately, this research paints a bleak picture of the current persistence rates of students entering college academically underprepared and has the potential to have significant impact on the future of both students and our nation. The literature on student persistence clearly identifies that engaging students both socially and academically is essential to support persistence and ultimately the success of students.
Figure 8: Percentage of 2002 ATD Cohort of Developmental Students Persisting to the Second Term


Data that specifically examines the persistence of academically underprepared students suggests that significant number of students do not persist in many cases beyond the first quarter. My proposed research considers current student engagement strategies that may have positive effects on increasing the persistence of underprepared students. It will also provide data that will allow colleges to consider what institutional barriers may exist for underprepared students and inform and support institutional change.
Strategies for Improving Student Persistence

The purpose of this section is to review research on strategies that have a positive impact on student persistence. The majority of the literature available on student persistence does not focus specifically on academically underprepared students but does provide a foundation for understanding strategies for improving student persistence. Literature on strategies for improving student persistence identifies two main themes: (a) instructional based strategies and (b) institutional based strategies. Instructional strategies include considering methods employed inside the classroom such as learning communities and creation of college success courses. Institutional strategies include the elevation of developmental education as an institutional priority and the creation of a culture of evidence that can be used to evaluate progress and initiate new forms of intentional interventions designed to support student persistence.

Instructional strategies. Research consistently identifies that student engagement is an essential factor in increasing student persistence. However, current research done by the Community College Survey of Student Engagement (CCSSE) suggests that colleges must be intentional in their efforts to engage students (Community College Survey of Student Engagement, 2008). CCSSE research conducted at 585 community colleges included 343,000 students from 48 states and found that students are not on campus enough to benefit from spontaneous forums of engagement. CCSSE maintains that in order to effectively engage students colleges must be aggressive and deliberate about creating engagement strategies so that engagement becomes a central part of a student’s experience. CCSSE also asserts that underprepared students may be more engaged than their more academically prepared counterparts. Their findings suggest that academically
underprepared students must be more engaged in order to attain outcomes that academically prepared students attain with less effort (Community College Survey of Student Engagement, 2008). In order to intentionally engage students many community colleges are employing instructional strategies that research suggests have some positive effects and in many cases increase both student engagement and persistence. These strategies include the use of freshman seminars and learning communities.

**First year seminar.** First year seminars or student success courses are courses for entering students that are designed to help students transition to and engage socially and academically in the college environment ultimately increasing the chances that students will be successful (Barefoot & South Carolina Univ, 1993; Tinto, 1993). Course content generally includes study skills, critical thinking, introduction to campus resources, time management strategies and academic advising (Barefoot, 2004). Regardless of their topical focus, if freshman seminars are to be effective retention tools, Fidler (1991) suggests that they should be small in size (15-20 students) and include high levels of interaction based learning activities. Research suggests that freshman seminars are being used in some form by over 90% of colleges and universities in the United States (Barefoot, 2002).

Research on first year seminars is growing; one of the leaders in this area is the National Resource Center for The First-Year Experience and Students in Transition. The National Resource Center was created in 1986 at the University of South Carolina by John N. Gardner. In November 2006 the National Resource Center conducted its seventh national survey of first year seminar programming in American higher education (National Resource Center for the First Year Experience, 2007). The survey gathered data
from a total of 2,646 regionally accredited colleges and universities with undergraduate students. The information gathered by the survey included type of seminar, course topics, amount of credit, seminar size, teaching method, and age of seminar program. Of interest to this research study are the findings in the area of first year seminar, specifically in the area of persistence. Institutions that had conducted a formal program evaluation since fall 2003 were asked to report on results that could be attributed to participation in a first year seminar. Of 212 respondents 43.4% reported increased persistence to sophomore year. Unfortunately, the data available did not identify what level the students were who enrolled in the student seminar (developmental or college ready) and it did not specifically identify the credit amount to define sophomore year.

Research conducted at individual community colleges supports the findings of the National Resource Center for the First Year Experience. A four year longitudinal study conducted at an unidentified comprehensive community college found that on average students who participated in a freshman seminar enrolled for a second term at a 10% higher rate than those students who did not participate in a freshman seminar (Keenan & Gabovitch, 1995). Results like this are echoed by research conducted by Betsy Barefoot for the National Resource Center for the Freshman Year Experience (Barefoot & South Carolina Univ, 1993). Barefoot reviewed freshman seminar courses from 34 colleges and universities. This research included findings from eight community colleges. A review of the data from community colleges shows that in all cases students who participated in freshman seminars persisted to the following quarter at a higher rate than those who did not participate in freshman seminars. Grade point averages of those enrolled in freshman seminars were consistently higher than those who did not enroll in freshman seminars.
Several of these colleges reported increases in term to term persistence and GPA, but also reported that these increases diminished over time.

Recent research conducted at Moraine Valley Community College continues to support the benefits of freshman seminar courses (Jenkins & Wright, 2008). Moraine Valley created an introduction to college and student success course called College 101 (COL 101). The course was designed to enhance student development and student learning and to improve student retention and student success. Course curriculum was designed to introduce students to college resources available to them and requires each student to develop an individualized master academic plan.

The office of Institutional Research at Moraine Valley Community College conducted follow up research on each cohort of full-time students since fall 2000. Research consistently shows that students who complete COL 101 achieve higher first term GPA as well as cumulative first year GPA than those who did not enroll or complete COL101. Further evaluation shows that students who enroll in COL101 complete a higher percentage of their first semester credit hours and were statistically more likely to persist to the second term and to the second year.

While this research does support the concept that freshman seminar courses do increase persistence of first year students it does not specifically address the impact of these courses on academically underprepared students. Also, some of the research identifies that the positive impacts of freshman seminar courses decline after the quarter of enrollment and they do not identify if students persist to certificate or degree.

*Learning communities*. One of the most prevalent instructional approaches that has been shown to support student engagement is the creation of learning communities.
Minkler (2002) defines a learning community as a way of deliberately structuring the curriculum so that students are more actively engaged in a sustained academic relationships with other students and faculty over a longer period of time than in traditional course settings. Another definition of learning communities is, any one of a variety of curricular structures that link together several existing courses, or restructure curriculum in a manner that creates opportunities for students to gain deeper understanding and integration of the course material; and more interaction with instructors and fellow students as active participants in the learning process (Gabelnick, MacGregor, Matthews, & Smith, 1990). Regardless of the specific definition, active and collaborative learning are central themes of learning communities.

The earliest learning communities were established in 1927 at a residential learning community at the University of Wisconsin called the Experimental College. The Experimental College developed curriculum that was connected by common themes and focused on experimental and cooperative pedagogy (D. V. Price, 2005). During the 1970s learning communities advanced from an experimental practice to pedagogical reform and by the 80s and 90s become common practice at colleges and universities across the country (Fogerty, 2003).

Some of the earliest adopters of learning communities at community colleges include La Guardia Community College in the 1970s, followed by Daytona Beach Community College and Seattle Central Community College in 1984 (Minkler, 2002). The Washington Center for Improving the Quality of Undergraduate Education currently has over 250 member colleges and universities, and of these, over 100 two-year colleges
identifying active learning communities. As this registry is voluntary, the actual number in the U.S. is likely to be higher (The National Learning Community Directory, 2009).

Some of the most common models of learning communities include: (a) residential programs where students live together and take a common set of courses; (b) team taught programs where as many as three instructors teach three courses with the same students; (c) large cohort courses where students are divided into smaller subsets and share additional learning experiences; and (d) clustered courses in which students enroll that are linked by a specific theme. The level and manner in which these courses are integrated can vary but the intention is to increase the type and amount of student engagement within the course curriculum (D. V. Price, 2005).

One of the most prevalent studies done at the community college level was conducted by Dr. Vincent Tinto (1997). Tinto conducted a mixed method study of the Coordinated Studies Program (CSP) at Seattle Central Community College. Tinto’s focus was to determine if participation in the program had a positive influence on both student learning and achievement. CSP courses primarily included college level humanities courses linked together by theme. Tinto employed both quantitative and qualitative methods in his research. The quantitative method used was longitudinal and employed random samples of students enrolled in CSP courses and students enrolled in regular courses. Questionnaires based on Pace’s Quality of Student Effort Scale were given to students at the beginning and end of each quarter. A regression analysis was then used to evaluate how a student’s experience impacted their behaviors and academic outcome. The results indicated that students who participated in CSP courses reported greater engagement in both academic and social areas than students in stand-alone courses. The
regression analysis also demonstrated that students in CSP courses persisted to the next quarter and transferred to a university at a higher rate than students taking stand alone courses. Other outcomes of this study were three themes that emerged: (a) building supportive peer groups, (b) creating shared learning that bridges the academic and social divide, and (c) student voice in the construction of knowledge.

One year later Tinto (Tinto, 1998) conducted similar research at La Guardia Community College this time focused on a CSP program that included developmental reading, writing, and oral communication. Students in this study enrolled in the three linked courses as well as a freshman seminar course. Tinto employed the same type of methodology used at Seattle Central Community College. The outcome of this research was more qualitative in nature and identifies the same type of findings as Seattle Central but does not clearly identify increased persistence beyond the following fall quarter as an outcome.

Other learning community research targeted at academically underprepared students was conducted at Spokane Community College (MacGregor 1991) and at Skagit Valley College (Whitmer 1991). Both studies report positive grade performance of students enrolled in CSP courses as opposed to those enrolled in stand-alone courses. However, neither of these studies reported increased persistence as an outcome of participation in a learning community.

Recent research conducted at Virginia Western Community College (Wilmer, 2009) used a quantitative non-experimental correlational design to determine how demographic characteristics and course content influenced student engagement. The study compared students enrolled in a developmental English learning community to
those enrolled in a stand-alone course. Comparisons used two elements. The first included a locally designed demographic information sheet. The second element was the Institutional Integration Scale developed by Pascarella and Terenzini (1979) that measures the level of interaction by determining the level of social and academic integration and goal and institutional commitment. The results indicated a statistically significant increase in student engagement by those students enrolled in the learning community as opposed to those who were enrolled in stand-alone courses. Although this study does report increased student engagement it does not consider whether increased engagement led to increased persistence.

Another study conducted at Kingsborough Community College evaluated the two-year effects of a learning community program designed for students in developmental English courses (Scrivener et al., 2008). The study consisted of over 1,500 entering freshman that were brought in to the study in four different cohorts fall 2003, fall 2004, spring 2004 and spring 2005. Students were chosen for the study based on reading and writing test scores administered prior to enrollment. Students who placed into developmental English for native speakers or freshman English then were informed about the program and self identified. Students were then assigned to a program group or the control group. Those in the program group participated in three linked courses. The first course was a freshman seminar focused on time management, study skills, college procedures, exploration of learning styles, career exploration and learning styles, multicultural diversity and other topics important to new college students. The second course was a course that was required for the individual student’s major for example
psychology, history or health. Finally, students enrolled in a developmental English course. Students in the program were then tracked for a period of three quarters.

The results of the program were determined using both quantitative and qualitative methodology including student data from the college database as well as a student questioner (Scrivener et al., 2008). Analysis suggests that students that participated in the program felt more engaged than students in the control group. Student data identified improved educational outcomes while students were enrolled in the learning community, but effects diminished in subsequent semesters. For example, students in the program group attempted and passed more classes during their first semester. Students in the learning communities were also more likely to take and pass English assessment tests required for transfer or graduation. Evidence is mixed about if the program actually increased student persistence. Initially the data suggested that participation in the program did not affect the rate at which students re-enrolled. However during the last semester of the two-year follow up slightly more program group members were enrolled in college than those in the control group.

**Institutional Strategies**

*Elevate institutional commitment to developmental education.* Boylan (1999) points out that the foundation of quality developmental education is built on an institutional commitment to the concept of educational development. Literature suggests that this kind of environment exists when developmental education is explicitly stated as part of the mission of the institution, and seen as an integral part of the campus academic community (Boylan, 1999; Keimig, 1983; Roueche & Baker, 1987; Roueche & Roueche, 1993). In a study of 28 exemplary developmental education programs at community
colleges all but one rated developmental education as extensively important when assessing institutional priorities (Boylan, 2002). The level of institutional commitment is expressed in the number of course offerings and variety of support services available to meet student needs. Literature suggests that systematic and comprehensive systems of developmental education require institutional investment, and have the greatest potential for success of developmental students (McCabe & Day, 1998; Ritze, 2005; Roueche & Roueche, 1999).

One characteristic of institutional commitment that is critical to the success of a developmental education program is a comprehensive and articulated philosophy of developmental education. This comprehensive philosophy must be shared by all stakeholders. This type of philosophy should be developed through the use of a coordinated effort involving multiple stakeholders within the institution (Boylan, 2002; R. McCabe, 2000; Rouche & Rouche, 1999). In his book, Yes We Can: A Community College Guide for Developing America’s Underprepared Robert McCabe (2003) suggests several factors that signify an institution wide commitment to a strong developmental program: (a) identifying developmental education as a major element of its mission and goals, (b) allocating appropriate resources, and (c) publicly supporting the developmental program. By integrating these factors into the fabric of the institution, the climate of the institution becomes one that respects the importance of developmental education and welcomes underprepared students as they enter the institution (McCabe, 2003).

With the growing need for developmental education it is essential that community colleges provide the support necessary for developmental education programs on
campuses across the country. Support includes facilities, appropriate staffing for instruction and support of students, professional development opportunities for faculty, and regular evaluation of these programs. Literature suggests that “strong administrative support generally equals a strong developmental education program” (McCabe, 2003, p. 47). This is echoed by Roueche & Roueche (1999) who add that an institution-wide commitment is an essential element of a program’s success. This type of commitment by institutions can be visible on campus by considering where developmental facilities are located, what academic support services are contiguously located, how facilities look and feel, and more importantly how they make students feel. Vincent Tinto (Spann, 1990) points out the need for institutions to centralize programs for at-risk students and make them integrated, not segregated, experiences for students. Institutions send messages about their commitment to serving underprepared students to faculty and staff. These can be sent in several ways including, who the college hires to teach in developmental education, how they are valued or recognized within the institution, and whether they reflect the demographics of the population (McCabe, 2003). Literature points out that in order to have quality developmental education programs institutions must hire well trained faculty and staff (Boylan, 1999; Boylan, Bonham, & Bliss, 1997; McCabe, 2003; Roueche & Roueche, 1993). Boylan (1999) suggests that “not everyone can teach developmental courses just because they have an advanced degree” (p. 9). In order to effectively teach developmental students, faculty must have not only good subject knowledge, but they must have an understanding of developmental students and how they learn and process information.
Although the literature supports the essential nature of identifying, recruiting and hiring trained developmental faculty only 20% of institutions participating in a national study reported requiring full-time faculty to have specific training in developmental education before teaching developmental courses (Shults, 2002). Boylan (2002) suggests a relationship between the negative attitudes of faculty toward developmental education and poor program outcomes, but specific effects of the relationship are not included in the literature.

**Develop a culture of evidence.** Educational leaders are consistently urging colleges to create a culture of evidence about the success or challenges that exist within community college (McCabe, 2003; Roueche & Roueche, 1994; Tinto, 1998). Creating this type of culture requires colleges to gather and evaluate data and then actively disseminate that data across the institution to engage faculty and staff in creating and supporting effective student engagement within the institution.

Based on the findings of the first five years of data collected by CCSSE colleges are strongly encouraged to gather data in order to create a culture of evidence that colleges can use to set goals, review progress and improve practice (Community College Survey of Student Engagement, 2008). In order to build a data driven culture of evidence CCSSE encourages colleges to disaggregate data in order to examine results for different student groups.

McCabe (2003) suggests that cohort tracking entering students is an effective way to assess the effectiveness of supporting the needs of underprepared students and provides program accountability. McCabe (2003) identifies 11 questions that provide the foundation for this process.
• What percentage of an entering cohort needs to take one or more developmental courses?

• How many of those taking developmental courses are successful (GPA 2.0) in the first term?

• How many are retained for the next term?

• How do the previous two rates compare to those in the original cohort that did not require remediation?

• What is the fall to fall retention rate for the developmental portion of the cohort?

• What percentage of the developmental cohort completes the developmental sequence?

• How do those who complete the developmental sequence perform in subsequent sequences such as English composition and college algebra?

• How did those from the original cohort who did not need remediation perform in the same courses?

• How do graduation rates (three to six year) for the developmental portion of the cohort compare to those in the cohort not needing remediation?
• What is the average number of terms (or years) required for students to complete the developmental sequence?

• Are there differences in outcomes within the cohort on the basis of race, ethnicity, gender or age?

Other current research on the persistence of community college students uses longitudinal data to answer questions about student progression and persistence. Leinbach and Jenkins (2008) have developed a Milestone model that organizes quarterly student transcript data and student characteristics into a resource for understanding student progression and achievement. The Milestone model is made up of a series of academic achievements or momentum points. Momentum points are measurable educational attainments, such as completing English 101. These Momentum points then lead to milestones such as earning a certificate or transferring to a baccalaureate program, as well as intermediate milestones such as completing developmental education requirements. Leinbach and Jenkins (2008) maintain that many college students do not reach terminal milestones and some do not ever reach intermediate milestones. For this reason colleges need to research beyond simply rates of milestone achievement to examine the factors that contribute to milestone achievement.

Summary

In today’s global economy educational level is directly linked to earning potential (McCabe 2000) and the twenty-first century workforce offers a growing number of jobs with the potential to bring prosperity to thousands of Americans (D. Jenkins, 2002). However 42% of all students who complete high school do not have the required skills to
begin college level work (McCabe 2000). This gap between the availability of opportunities and the lack of academic skill level is highlighted by research that suggests that the more developmental education a student requires the less likely they are to earn a degree (Adelman, 1998). Addressing this issue has been identified as one of the most important issues facing today’s community colleges (Bailey & Alfonso, 2005). Research further indicates that there is a lack of research that specifically focuses on student persistence at community colleges (Bailey & Alfonso, 2005).

Literature reviewed to identify characteristics of students entering community colleges found that 8 out of 10 students were identified as having varying degrees of need for developmental education (Clery, 2006). The same research suggests that students who do not complete some developmental education during the first quarter have the lowest rates of persistence (Clery, 2006). Both the high need for developmental education and the low persistence rates of academically underprepared students support the need for more research in this area.

Another issue that is identified in the literature is reflected in the racial/ethnic shifts that are projected in the United States and the significant numbers of minorities enrolled in developmental education. Research indicates that during the next 20 years the United States will become more ethnically diverse and that most of the growth in the population is predicted to occur in those populations that are the least educated and have limited access to postsecondary education (Kelly, 2005). Research further indicates that on average 20% of students in all of the racial and ethnic categories are identified as academically underprepared and not prepared for college level courses (McCabe 2000).
There is a large amount of research done on student persistence. Although theories differ in some areas there is agreement that there are some key factors in student persistence. The most identified include but are not limited to: (a) academic integration, (b) social integration, (c) socioeconomic status, (d) gender and (e) race (Pascarella & Terenzini, 1979; Spady, 1970; Tinto, 1975, 1993). Unfortunately much of this research has been conducted on students enrolled in four year universities. Researchers including Tinto (1993) and Bailey and Alfonso (2005) suggest that the lack of research focused specifically on the community college presents a serious problem when it comes to the study of retention or persistence of community college students.

Research illustrates that educational leadership is encouraging community colleges to be more committed to increasing student persistence by creating a culture of evidence of both the challenges and successes that exist within community colleges (McCabe, 2003; Roueche & Roueche, 1994). In order to create this type of culture colleges must conduct research that informs the process of institutional goal setting, progress review and ultimately improve practice. Some of the methods to create this culture of evidence include the tracking of cohorts (McCabe, 2003) as well as the use of longitudinal data to track student achievement (Leinbach & Jenkins, 2008).

Community colleges are also being encouraged to consider instructional strategies that are designed to increase student persistence. Research consistently recognizes freshman seminars and learning communities as effective strategies for increasing the engagement and ultimately the success of underprepared students. Tinto in his book, Leaving College (1993) found that participation in a learning community increased the probability of semester to semester persistence. Tinto suggested that learning
communities promote persistence through the creation of supportive peer groups of students. Research demonstrates that freshman seminar courses provide the same type of active engagement. This type of peer group support is also consistent with the research done by Karp, Hughes and O’Gara (2008) that demonstrated the importance of a strong information network for community college students. Unfortunately, there is little research that specifically considers the effects of using strategies like learning communities or freshman seminars to increase the persistence of underprepared students in developmental education programs in community colleges. Further research identifies the need for colleges to actively recognize the importance of developmental education as a way to meet the needs of academically underprepared students and create a gateway to college level courses. In order to consider effective ways to improve programs like developmental education, freshman seminar courses or learning communities research suggests the need to gather, evaluate, and disseminate data.

My proposed research employs all of these ideas. By using college data to identify factors that support the persistence of academically underprepared students this research has the potential to add to the body of existing research, as well as create new knowledge by considering not only underprepared students as a unique group, but also evaluating the effects of learning communities and freshman seminars beyond simply initial quarter persistence. Ultimately, implementing a strategy that focuses on the needs of underprepared students is one of the most promising ways to support the learning and persistence of underprepared students at community colleges. This research has the potential to help colleges use data to create connections between academic affairs, student affairs, and support services. These connections can encourage students to become
involved and persist in college. Tinto (1987) believes that colleges are systems comprised of linked and interactive parts, people and programs. All of these components must work together and are necessary for student success.
Chapter 3: Design of Study

The purpose of this study is to identify factors that demonstrate a relationship to an increased likelihood of persistence of academically underprepared first time, full and part-time, students enrolled in an urban community college. This section will describe the philosophical assumptions and approach, the research methodology, and provide information about the site and participants identified for this research.

The research questions, independent variables, dependent variables and null hypothesis for this research are as follows:

1. What is the relationship between entering college two or more levels below college level and persistence to 45 college level credits?

   *Independent Variable:* developmental need at college entry

   *Dependent Variable:* completion of 45 college level credits.

   *Null Hypothesis:* There is no relationship between entering college two or more levels below college level and persistence to 45 college level credits.

2. What is the relationship between demographic variables (gender, age, race/ethnicity, enrollment status and socio economic status) among academically underprepared students who persist to 45 college level credits?

   *Independent Variables:* gender, age, race/ethnicity, and socio economic status.

   *Dependent Variable:* completion of 45 college level credits.

   *Null Hypothesis:* There is no relationship between demographic variables (gender, age, race/ethnicity, enrollment status and socio economic status) among academically underprepared students who persist to 45 college level credits.
level credits.

3. What is the relationship between first quarter GPA and the persistence of academically underprepared students to 45 college level credits?

*Independent Variable:* first quarter GPA.

*Dependent Variable:* completion of 45 college level credits.

*Null Hypothesis:* There is no relationship between first quarter GPA and the persistence of academically underprepared students to 45 college level credits.

4. What is the relationship between the successful completion of a freshman seminar course and the persistence of academically underprepared students to 45 college level credits?

*Independent Variables:* completion of a freshman seminar course.

*Dependent Variable:* completion of 45 college level credits.

*Null Hypothesis:* There is no relationship between successful completion of a freshman seminar course and the persistence of academically underprepared students to 45 college level credits.

5. What is the relationship between participation in a learning community and the persistence of academically underprepared students to 45 college level credits?

*Independent Variables:* participation in a learning community.

*Dependent Variable:* completion of 45 college level credits.

*Null Hypothesis:* There is no relationship between participation in a learning community and the persistence of academically underprepared students to 45 college level credits.
Philosophical Approach: Post-positivism

In order to conduct relevant and quality research researchers must acknowledge the philosophical assumptions that position them on the continuum of what the goals of research are and what constitutes good research (Bettis, 2001). Initially when I considered an appropriate methodology for examining factors that lead to persistence I was drawn to a very quantitative, positivistic approach. Upon further research and reflection I have found myself drawn to continue with quantitative research but more to the common sense approach that is aligned with critical realism in educational research. This awareness has led me to take a post-positivist approach to my research. There are many definitions of post-positivism. For the purposes of my research I have identified the definition by Guba and Lincoln (1994). In this context, post-positivism is identified as a "humbler version of the scientific approach, one that no longer claims an epistemologically or metaphysically privileged position" (Bettis, 2001, p. 1). This approach allows that all observations are imperfect and all theories are revisable (Trochim, 2006). In order to provide a foundation for this research and identify the similarities in the philosophical approaches I will provide a summary of the characteristics of both positivism and post-positivism.

Positivism has been one of the dominant philosophical viewpoints for over 400 years (Denzin & Lincoln, 2005). Originating in the nineteenth century Auguste Comte is credited with identifying the term positivism (Zammito, 2004). Comte held to the belief that all science fell under one method based in physical sciences and mathematics. Comte and those with a positivistic viewpoint believed the scientific method to be the only tool appropriate for accessing and understanding truth and reality, thus creating a way to
understand, predict and control phenomena (Krauss, 2005). The emphasis in positivistic research is based on logic, rigor, mathematical practices and correlation control (Bredo & Findberg 1982). The positivistic lens requires that the researcher maintain a value free point of view (Healy & Perry, 2000) and that knowledge exists in three forms: (a) particular observations, (b) laws or empirical generalizations, and (c) theoretical statements and definitions (Bredo and Finberg, 1982). Positivists believe that meaningful statements are analytic (true by definition) or synthetic (true or false based on experience) and this distinguishes between what is scientific and what is not. Ultimately positivists acknowledge that true objectivity is difficult to achieve but believe that it is possible through the use of manipulative research methods (Guba & Lincoln, 1994).

Positivism is not without criticism. One of the key points of criticism is the relationship between theory and observation. Positivists believe in a distinct separation between the observer and the theory. Critics believe that the researcher is an active part of the social world and thus cannot be completely detached from the observations they make. This suggests that neither theory nor observations are independent of each other as suggested by positivism (Bredo & Feinberg, 1982). The other key criticism of positivism is that positivistic believe that all observation consists of formal rationalization or logical deduction which then does not allow for any practical rationality (Bredo & Feinberg, 1982). Critics suggest that in order apply theory to practical applications individual interpretations must be allowed.

During the middle of the twentieth century critics of the positivistic viewpoint developed a new epistemological viewpoint. This new lens was a shift from positivism to post-positivism (Guba & Lincoln 1994). The post-positivist lens suggests that there is no
neutral observation free from theory. Trochim (2006) suggests that the positivist blends the methodology and thought process of scientists with the way people think and apply things in our everyday lives. He further asserts that scientific reasoning and common sense are essentially the same. The difference exists only in the extent that reasoning is applied through the use of specific procedures for collecting data and recording and verifying accurate and consistent results. While these scientific methods may not be used in our everyday reasoning there is a connection.

Assumptions about the nature of truth. Post-positivists believe that all research including educational research should be scientific. Philips and Burbules (2000) suggest that research should be guided by the best knowledge currently available. This supports the positivistic idea that evidence plays a key role in our individual judgments about truth. Further, they believe that knowledge is hypothetical and changeable over time. Unlike the positivist viewpoint post-positivists believe that research cannot be completely value free and is impacted by the cultural and theoretical viewpoint of the researcher. Ultimately then, since multiple realities exist and truth lies within the viewpoint of the observer, multiple truths also exist (Phillips & Burbules, 2000). The goal then of research is not to define all truths but to “develop relevant true statements that identify or describe the relationships that are the focus of interest” (Phillips & Burbules, 2000, p. 38).

Research supports the theory that post-positive research should be quantifiable, generalizable, and reproducible (Trochim, 2006; Vogt, 2007). Schutt (2006) further suggests that those using the post-positive lens to conduct research should adhere to some basic guidelines when conducting research. Those guidelines that apply to this study are: (a) test ideas against empirical ideas without becoming personally invested in a specific
outcome; (b) document and disclose all procedures publicly to allow others to evaluate them; and (c) clarify assumptions. This evaluation by the research community is what builds and creates new knowledge. By disclosing any assumptions those conducting research provide information for those who wish to evaluate the conclusions reached. Finally, (d) maintain a skeptical position when reviewing current knowledge, this skepticism causes researchers to improve the validity of research.

**Research Methodology**

The purpose of this study was to examine what, if any relationship exists between: (a) demographic variables, (b) developmental need, (c) first quarter GPA, (d) first year seminar, and (e) participation in a learning community on the likelihood of completion of 45 credits by academically underprepared first-time, full and part-time, community college students enrolled in associate degree level, pre-baccalaureate programs of study.

The research procedures employed in this study are identified below. They include research design, context, population, data collection and data analysis.

**Research design.** Post-positivist methodology is most often associated with a quantitative approach. This study used both descriptive and inferential methods, to measure the degree of association between factors supporting persistence of academically underprepared students at a community college. Creswell (2002) asserts that descriptive statistics present information that helps examine information within a database and determine overall trends as well as the distribution of data. In order to establish this description of student characteristics within the cohort a frequency distribution was constructed. This was followed by the use of binary logistic regression to evaluate the
existence, direction and strength of the relationships between each of the independent variables and the dependent variable the completion of 45 college credits.

**Site selection.** The site for my research was Tacoma Community College (TCC). It was selected for several reasons. Tacoma Community College began serving students in 1965. Tacoma Community College is located in Tacoma, Washington about 60 miles south of Seattle. Currently TCC serves approximately 15,000 (6,747 FTE) students annually and is one of the most diverse colleges in Washington. Not unlike many urban community colleges in order to achieve its mission TCC provides developmental courses to over 4,000 students per year. The college has a strong commitment to using data to consider institutional change. During the past several years the college has consistently collected and evaluated data to inform changes within the institution. Some of these changes include a strong commitment to the success of academically underprepared students. The second reason for selecting Tacoma Community College was that they are currently using both freshman seminars and learning communities as strategies to support the persistence of students in developmental education. TCC has been using these strategies for several years which will allow me to consider the longer term effects of these strategies. Finally, due to the commitment in both these areas the college has already offered access to college data and resources necessary to complete this research.

**Population:** The population of students used for the purposes of this research was a cohort of first time, full and part-time, community college students enrolled in associate degree pre-baccalaureate programs of study, at Tacoma Community College during Fall quarter 2005. Students in this cohort placed below college level in mathematics, reading or English. Student scores on the Accuplacer test, which is required by the college prior
to enrollment for all first time students, determined placement. This cohort was selected because it allows for a five-year period of evaluation, which is best suited for analysis using logistic regression. It was also selected due to efforts made at Tacoma Community College to improve persistence of students in developmental education during the five-year period and commitment by the college to conduct this type of research.

Data collection techniques. Data for this research was collected from the Tacoma Community College enrollment database. The data was retrieved with the assistance of the college’s Institutional Effectiveness Office. In order to gather the data necessary a number of database searches and queries were necessary. Data was based on a cohort of first-time, full and part-time students that started at TCC in the fall of 2005. Selection of this cohort allows for an appropriate amount of time for student progression and the application of linear regression.

Data analysis: Logistic regression. To describe the relationship between an outcome (dependent) variable and one or more explanatory (independent) variables, statistical regression methods are used. The method of data analysis that was used in this study is logistic regression. According to Tate (1995) logistic regression accurately predicts the probability that an individual will fall into one category. Logistic regression is an appropriate method when the outcome variable is dichotomous (Creswell, 2005; Tate, 1995). In this research a student either completes 45 college level credits or does not. The outcome is dichotomous: either yes or no (coded as 0 or 1).

For the purpose of this research the dependent variable is defined as students’ persistence through developmental education and the completion of 45 credits of college level courses. Dependent variables rely upon the independent variables and are
considered the outcomes or results of the influence of the independent variable (Creswell, 2005). The completion of 45 college level credits is used in this research because it was identified as the key to individual educational success by the Washington State Board of Community and Technical Colleges (Prince & Jenkins, 2005). This is echoed by research conducted by the National Center for Educational Statistics (McCormick, 1999). This study was a longitudinal study of college graduates between 1980 and 1993. The study found that students who completed at least 20 semester credits during the first year ultimately averaged 86 overall semester credits. Those students completing 30 semester credits (the equivalent of 45 quarter credits) in the first year completed an average of 128 semester credits overall and 91% of those completing 30 semester credits in the first year completed a bachelor’s degree. Other research argues that successfully passing gatekeeper classes, or developmental and initial college level courses can substantially increase the probability of earning some type of secondary credential (Adelman, 2006; Bailey & Alfonso, 2005).

Since completion of 45 credits is not a continuous variable it is identified as a categorical variable. In this case the most appropriate model for evaluating these variables is logistic regression (Tate, 1995). Tate (1995) suggests that logistic regression produces a regression that accurately predicts the possibility that an individual will fall into one category. Persistence as defined in this study is a dichotomous variable; therefore a binary logistic regression model will be used to determine if the independent variables identified were predictors of persistence.

Creswell (2005, p.121) defines an independent variable as “an attribute or characteristic that influences or affects an outcome or independent variable. In the current
study eight independent variables were identified: (a) ethnicity, (b) age, (c) enrollment status, (d) socio-economic status (SES), (e) first quarter GPA, (f) developmental need, (g) participation in a learning community, and (h) completion of a first year seminar course. These variables were chosen because of their prevalence in the literature and their inclusion in theoretical frameworks to explain student persistence.

Age and gender were included as they have been consistent factors included in persistence research conducted by Tinto (1975) Pascarella and Terenzini (1979), and Boylan, Bonham and Bliss (1994). For the purposes of this research students were placed in one of three age categories: a) 22 and under, b) 23-29 and c) over 30. These categories represent three groups of students attending community colleges. The first of these are considered traditional age college students (22 and under) these students typically enter college directly after high school or within a year or so of graduation. The second group represents students 23-29 who entered the workforce directly after high school and have enrolled in community college in order to gain skills to gain better employment or to further their education at a university. Finally students age 30 and above represent what are considered non-traditional students at community colleges. Likewise, socio-economic status was identified an indicator of persistence due to the existence of research by Knopp (1996) McCabe and Day (1998) and Roueche and Roueche (1999) that identify low socio-economic status as a characteristic of students in developmental education and a predictor of student departure (Spady, 1970). For the purposes of this research using binary logistic regression students were placed into one of three income categories based on the data available in the Tacoma Community College database. The categories include
(a) low income less than $30,000 dollars per year, (b) Medium income $30,001 - $50,000 per year, and (c) over $50,000 per year.

Ethnicity was identified as an independent variable due to research that suggests that on average 20% of minority students in all categories are seriously academically underprepared (McCabe, 2000). More recent research supports McCabe’s findings by suggesting that of those students entering community college with serious academic deficiencies racial and ethnic minorities are over represented (Clery, 2006). In order to establish categories appropriate for the use of binary logistic regression students were placed into one of seven categories based on the information in the student database. The “Other” category is used to indicate students self identified as other in the student database.

Enrollment status, GPA and developmental need have all been identified as indicators of student persistence and for these reasons were identified as independent variables for this study. Several studies (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993) indicate that the number of credits taken in any one term was related to persistence. Feldman concluded that part-time students were over two times more likely to drop out than full-time students. Grade point average (GPA) was selected as it is identified as an indicator of persistence by Tinto (1975), Pascarella and Terenzini (1983) and Spady (1970). The identification of a 2.0 GPA was selected as it is identified as “satisfactory academic progress” by Tacoma Community College academic policies. Students who complete each quarter with a 2.0 or above are considered to be making satisfactory academic progress. Those below a 2.0 are placed on academic warning. Developmental need was identified as an indicator of persistence in research conducted
by Adelman (1988) that indicates that the more developmental courses students are required to take the less likely they are to earn a degree.

Participation in learning communities and completion of first year seminar courses were selected as independent variables because they represent instructional strategies that have been shown to have a positive impact on student persistence. Research conducted on the impact of participation in a first year seminar course has been shown to increase student persistence (Barefoot & South Carolina Univ, 1993; Jenkins & Wright, 2008; Keenan & Gabovitch, 1995). Research conducted on learning communities also indicates a positive impact on student persistence (Tinto, 1997, 1998). Research also suggests that participation in learning communities has also been shown to increase student engagement (Scrivener et al., 2008; Wilmer, 2009).

**Coding variables for logistic regression.** Logistic regression generally functions best when dependent variables are either dichotomous or have relatively few data points (Aldrich & Nelson, 1984). Limiting data points is necessary because a large range of data values can produce either very large or very small numbers in the exponential log function step of the regression. For example, numeric variables like grade point average that have many values for any given sample may prohibit the use of logistic regression.

In this study, the dependent variable completion of 45 college level credits has only two outcomes, completion (coded as 1) and non-completion (coded as 0). Many of the other variables included in this study are modified in order to derive dichotomous outcomes or reduce the range of values. In coding financial variables as ordinal scales, it is assumed that they are variable scales, and are continuous and linear (St. John, Andrieu, & Starky, 1994).
A strength of logistic regression is that the model may contain many variables, some of which may be on different measurement scales (Hosmer & Lemeshow, 1989). If some variables are nominal, it is inappropriate to code them as if they were interval scaled. This requires the use of design variables. For example, if the data for ethnicity includes four choices (African American, Caucasian, Hispanic and Other), three design variables would be created. They are African American, Hispanic and other (all coded as 0=no 1=yes). All of the subjects would be coded as either “yes” on one of the variables or “no” on all of the variables (for the Caucasian group).

Figure 9 describes the coding used in this study. When using a logistic regression model Hosmer and Lemshowe (2000) suggest that the first step is to analyze the impact of each independent variable on the dependent variable by using a univariate model. For the purposes of this research the following independent variables have been identified: (a) ethnicity, (b) age, (c) enrollment status, (d) socio-economic status (SES), (e) first quarter GPA, (f) developmental need, (g) participation in a learning community, and (h) completion of a first year seminar course.

They recommend that the second step is to enter all of the independent variables into the model by using a multivariate model. Univariate correlations can be a good initial indicator of which independent variables might be significant multivariate models. Specifically, any variable that has a \( p \) value <.25 for the univariate test should be considered in the multivariate model. After evaluating the association between the dependent and the independent variables, the phi coefficient is used to determine the statistical strength of the association between the two variables.
### Figure 9. Data Coding

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Coding</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental Need</td>
<td>2 or more levels below college level</td>
<td>0=no</td>
<td>1=yes</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>African American</td>
<td>0=no</td>
<td>Compared to Non-African American Students</td>
</tr>
<tr>
<td></td>
<td>Hispanic</td>
<td>0=no</td>
<td>Compared to Non-Hispanic Students</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>0=no</td>
<td>Compared to Non-Asian Students</td>
</tr>
<tr>
<td></td>
<td>Pacific Islander</td>
<td>0=no</td>
<td>Compared to Non-Pacific Island Students</td>
</tr>
<tr>
<td></td>
<td>American Indian</td>
<td>0=no</td>
<td>Compared to Non-American Indian</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>0=no</td>
<td>Compared to Non-White Students</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0=no</td>
<td>Compared to Caucasian Students</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>0=no</td>
<td>Compared to male students</td>
</tr>
<tr>
<td>Age</td>
<td>22 and under</td>
<td>0=no</td>
<td>Compared to students between 23 and 29</td>
</tr>
<tr>
<td></td>
<td>Over 30</td>
<td>0=no</td>
<td>Compared to students between 23 and 29</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td>Full time enrollment</td>
<td>0=no</td>
<td>FT =12 credits</td>
</tr>
<tr>
<td>SES</td>
<td>Low income- less than $29,515</td>
<td>0=no</td>
<td>Compared to students with medium income</td>
</tr>
<tr>
<td></td>
<td>High income – greater than $47,738</td>
<td>0=no</td>
<td>Compared to students with medium income</td>
</tr>
<tr>
<td>First Quarter GPA</td>
<td>GPA above 2.0</td>
<td>0=no</td>
<td></td>
</tr>
<tr>
<td>First Year Seminar Course</td>
<td>Successfully completed course</td>
<td>0=no</td>
<td></td>
</tr>
<tr>
<td>Learning Community</td>
<td>Participation</td>
<td>0=no</td>
<td></td>
</tr>
</tbody>
</table>
Summary

This chapter defined the quantitative methodology used in this research to examine factors that support the persistence of academically underprepared community college students. This chapter further provided a detailed description of the design of the study, the site and population, as well as the data collection process and statistical method used to analyze the data.
Chapter 4: Results

The purpose of this study was to identify what, if any, relationship exists between selected demographic and academic variables and the completion of 45 credits by academically underprepared community college students. This chapter provides the results of the data analysis done on a cohort of academically underprepared students at a community college. Included in this chapter is a description of the population used in the study and results of the logistic regression analysis of the data related to each of the research questions. These questions were:

1. What is the relationship between entering college two or more levels below college level and persistence to 45 college level credits?
2. What is the relationship between demographic variables (gender, age, race/ethnicity, first quarter enrollment status and socio-economic status) among academically underprepared students who persist to 45 college level credits?
3. What is the relationship between first quarter GPA and the persistence of academically underprepared students to 45 college level credits?
4. What is the relationship between the successful completion of a freshman seminar course and the persistence of academically underprepared students to 45 college level credits?
5. What is the relationship between participation in a learning community and the persistence of academically underprepared students to 45 college level credits?
**Data Collection**

This study examined an existing set of data in order to determine the existence of relationships between selected demographic and academic variables and the completion of 45 college level credits by academically underprepared community college students. The Institutional Research Office at Tacoma Community College identified a cohort of students who met the criteria for this study. That data was then coded for the use of binary logistic regression according to the process provided in Chapter 3 of this document.

**Descriptive Data**

The population of students used for the purposes of this research is a cohort of first-time, full and part-time, community college students enrolled in associate degree pre-baccalaureate programs of study, at Tacoma Community College during Fall quarter 2005. Students in this cohort placed below college level in mathematics, reading or English. Student scores on the Accuplacer test, which is required by the college prior to enrollment for all first time students, determined placement. This cohort was selected because it allows for a five-year period of evaluation that is best suited for analysis using logistic regression. It was also selected due to efforts made at Tacoma Community College to improve persistence of students in developmental education during the five year period.

The cohort used in this research was based on the academic records of 604 students, but due to various missing elements such as SES information or ethnic identification necessary for this research, 548 (n=548) students met the criteria specified
for this research identified above. The frequencies for the variables identified in this research are identified in Table 1.

The sample was 58.9% (323) female and 65.3% (358) were under the age of 22. In terms of race/ethnicity 60.4% (331) of the students identified as Caucasian, while 16.6% (91) were African American and 2.4% (13) were Hispanic. The cohort also consisted of 6.4% (35) of students who identified as Asian, 0.5% (3) students identified as Pacific Islander, 1.3 % (7) Native American and 3.5% (19) identified as Other. The sample was made up of 75% (406) full-time students.

Table 1: Sample Distribution Frequencies

<table>
<thead>
<tr>
<th>Developmental Level</th>
<th>1 level below</th>
<th>2 or more below</th>
<th>20.4%</th>
<th>79.6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>225</td>
<td>41.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>323</td>
<td>58.9%</td>
<td></td>
</tr>
<tr>
<td>22 and Under</td>
<td>No</td>
<td>268</td>
<td>34.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>280</td>
<td>52.0%</td>
<td></td>
</tr>
<tr>
<td>23 to 29</td>
<td>No</td>
<td>268</td>
<td>48.9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>280</td>
<td>51.9%</td>
<td></td>
</tr>
<tr>
<td>30 and Over</td>
<td>No</td>
<td>470</td>
<td>85.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>78</td>
<td>14.2%</td>
<td></td>
</tr>
<tr>
<td>Full Time / Part-time</td>
<td>Part</td>
<td>142</td>
<td>25.9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full</td>
<td>406</td>
<td>74.1%</td>
<td></td>
</tr>
<tr>
<td>SES Low</td>
<td>No</td>
<td>381</td>
<td>69.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>167</td>
<td>33.9%</td>
<td></td>
</tr>
<tr>
<td>SES High</td>
<td>No</td>
<td>396</td>
<td>72.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>152</td>
<td>27.7%</td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>No</td>
<td>Yes</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>----------</td>
<td>----------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Race African American</td>
<td>457</td>
<td>91</td>
<td>83.4%</td>
<td></td>
</tr>
<tr>
<td>Race Asian</td>
<td>513</td>
<td>35</td>
<td>93.6%</td>
<td></td>
</tr>
<tr>
<td>Ethnicity Hispanic</td>
<td>535</td>
<td>13</td>
<td>97.6%</td>
<td></td>
</tr>
<tr>
<td>Race Native American</td>
<td>541</td>
<td>7</td>
<td>98.7%</td>
<td></td>
</tr>
<tr>
<td>Race Pacific Islander</td>
<td>545</td>
<td>3</td>
<td>99.5%</td>
<td></td>
</tr>
<tr>
<td>Race White</td>
<td>217</td>
<td>331</td>
<td>39.6%</td>
<td></td>
</tr>
<tr>
<td>Race Other</td>
<td>529</td>
<td>19</td>
<td>96.5%</td>
<td></td>
</tr>
<tr>
<td>First Quarter GPA</td>
<td>Below 2.0</td>
<td>148</td>
<td>27.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.0 or Above</td>
<td>400</td>
<td>73.0%</td>
<td></td>
</tr>
<tr>
<td>HD 101</td>
<td>No</td>
<td>430</td>
<td>78.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>118</td>
<td>21.5%</td>
<td></td>
</tr>
<tr>
<td>Learning Community</td>
<td>No</td>
<td>497</td>
<td>90.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>51</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td>Completed 45</td>
<td>No</td>
<td>355</td>
<td>64.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>193</td>
<td>35.2%</td>
<td></td>
</tr>
</tbody>
</table>

Another factor examined within this research is the relationship between a student’s socioeconomic status and completion of 45 credits. In order to evaluate this factor, students were ranked according to income level using the criteria established by the Washington State Board of Community and Technical Colleges (WSBCTC, 2007). Students were placed into SES categories between 1 and 5 based on the data available for
Washington in the year 2000: (a) 1, median household income $74,707 and above; (b) 2, median household income $55,625; (c) 3, median household income $47,437; (d) 4, median household income $39,925 and; (e) 5, median household income $29,515 and below.

For the purposes of this research, these categories were used to identify students as “low $0-29,515, medium $29,516-47 or high income $47,000 and above. Of the students in the sample 34% (167) placed in the lowest level, 38% (229) in the medium and 28% (152) in the highest level. These categories were identified in order to apply the available data to the logistic regression model as well as maintain necessary sample size for each group.

Of the students in this sample over 80% (436) placed two or more levels below college level in one or more of subjects including mathematics, English or reading. Over 73% (400) of the students in the sample completed the first quarter with a 2.0 or better GPA. The GPA of 2.0 was identified as the cut off because it is the indicator of satisfactory academic progress used by the college. Students who completed a first year seminar course represented 22% (118) of the sample and less than 10% (51) participated in a learning community. Of the 492 students included in this sample that started in the fall of 2005 approximately 35% (193) completed 45 credits by spring quarter 2010.

In terms of appropriate sample size, the literature does not offered specific rules applicable to logistic regression but provides some suggestions for best practice (Peng, So, Stage, & St. John, 2002). Several authors on multivariate statistics (Lawley & Maxwell, 1971; Marascuilo & Levin, 1983; Tabachnick & Fidell, 2001) have recommended a minimum sample size of 50 to 100. Based on this literature the size and
frequencies contained in this research are appropriate for logistic regression analyses. The only four elements in this sample that were identified as below the recommended level were the number (n=13) of Hispanic students identified in the sample, the number (n=19) of students who identified race/ethnicity as “Other”, the number of students who identified as Pacific Islander (n=3), and the number of American Indian (n=7). Complete lists of frequencies for this study are included in Table 1.

**Inferential Data**

For each of the research questions, binary logistic regression was used to analyze the relationship between the independent variables and the binary outcome variable (successful or unsuccessful completion of 45 college credits). All of the logistic regression analysis was conducted following the procedures described by Menard (2002). The method was selected because the outcome variable of interest, completion of 45 credits was dichotomous (completion or unsuccessful completion). Data was retrieved from the college student database and the logistic regression analysis was conducted using SPSS version 18 software. All of the variables were based on dummy coding, which allows for a dichotomous outcome when using more than two possible variables (Menard, 2002).

The outputs from conducting binary logistic regression analysis provides information about the existence of a relationship between the independent and dependent variable and the likelihood of change in the independent variable (Hosmer & Lemeshow, 2000). The first piece of information provided by logistic regression is the beta-value (B-value); this value provides information about the direction of the relationship. A positive value indicates that as the independent variable increases so does the likelihood of the
dependent variable, in this case the completion of 45 credits. Inversely, a negative B-value indicates that as the value of the independent variable increases, the likelihood of the completion of 45 credits decreases.

Logistic regression also provides a significance value (sig). This value is the indicator of statistical significance or the probability of rejecting the null hypothesis. For the purpose of this research a significance level of P<.05 has been established. This suggests that if the significance value is less than .05 then the null hypothesis would be rejected.

Logistic regression further provides odds ratio information (Exp B) that describes the odds of the dependent event (in this case completion of 45 credits) occurring given a change in the independent variable. Values greater than 1.0 signify that the variable being evaluated increases the odds of the dependent event occurring. Values of less than 1.0 decrease the odds of the event occurring and a value of exactly 1.00 indicates an equal likelihood of the event either occurring or not meaning the event cannot be accurately predicted and that there is not a statistically significant relationship (Pallant, 2005). In logistic regression the odds ratio indicates the probability of a student reaching 45 credits with respect to a given independent variable but does not rule out the possibility of this event happening by chance. Variables that are determined to be statistically significant have been identified as those indicators that are not happening by chance. It is possible that an indicator can have a high odds ratio suggesting increased likelihood but not demonstrate statistical significance. For example, in this study developmental level is not identified as statistically significant (Sig=.467) but does have a high odds ratio (Exp
This type of data is valuable to college administrators as they try and determine the most effective methods for supporting the persistence of students.

The following section presents the findings of the statistical analysis conducted using logistic regression for the five independent variables included in the current study. These variables were: (a) developmental level, (b) demographic variables, (c) first quarter GPA, (d) completion of a freshman seminar course, and (e) participation in a learning community.

Results

Research Question 1

What is the relationship between entering college two or more levels below college level and persistence to 45 college level credits? Of the students in this study 112 students tested into one level below college level in math, English or reading, while 436 (79.6%) tested two or more levels below college level. Logistic regression was used to determine the relationship between entering college two or more levels below college level and persistence to 45 college level credits. Two levels below was identified as a variable due to research that indicates that the more developmental courses a student is required to take the less likely they are to complete a degree (Adelman, 2006). Students who tested into one level below college level were identified as the reference category.

Table 2

Logistic Regression Results: Developmental Level

<table>
<thead>
<tr>
<th>Developmental Level</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.180</td>
<td>.467</td>
<td>.836</td>
</tr>
</tbody>
</table>

*p<.05
The results of the logistic regression for the variable “Developmental Level” in Table 2 suggest that as the need for developmental courses increases the possibility of completing 45 credits decreases (B = -0.180). The significance level identified was .467 suggesting that the null hypothesis would not be rejected, indicating that there is no statistically significant relationship between developmental level and the completion of 45 college level credits. The odds ratio Exp(B) .836 indicates that a student that enters college two or more levels below college level is 84% less likely to complete 45 credits than a student who begins college one level below college level.

Research Question 2

What is the relationship between demographic variables (gender, age, ethnicity, enrollment status and socio economic status) among academically underprepared students who persist to 45 college level credits? The first demographic variable examined in this study is gender. Of the students in the cohort used in this research 225 were male and 323 (58.9%) were female. In order to input the data necessary to use logistic regression male students were identified as the reference category.

Table 3:

*Logistic Regression Results: Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.017</td>
<td>.933</td>
<td>1.017</td>
</tr>
</tbody>
</table>

*p<.05

In this case the output of the logistic regression presented in Table 3 indicates that gender is not a statistically significant variable as the significance (Sig .933) is greater
than .05. The odds ratio $\text{Exp}(B) 1.0174$ indicates that females are about 2% more likely to achieve 45 college level credits than males.

**Age.** Age was also identified as a demographic variable examined within this study. In order to use coding appropriate for binary logistic regression students were identified in one of three age groups: 22 and younger, 23 to 29 and 30 and over. These categories identify students as fitting in two one of three groups traditional (22 and younger), limited work and skill (23-29) and non-traditional (30 and over). In this case the 23 to 29 year old group was identified as the reference category (constant). Of the students included in the cohort 358 (65.3%) were 22 or younger 112 were 23 to 29 and 78 were over 30.

Table 4

*Logistic Regression Results: Age*

<table>
<thead>
<tr>
<th>Age Group</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 and younger</td>
<td>0.281</td>
<td>.267</td>
<td>1.324</td>
</tr>
<tr>
<td>30 and over</td>
<td>-0.44</td>
<td>.898</td>
<td>0.957</td>
</tr>
</tbody>
</table>

*p<.05

Logistic regression presented in Table 4 indicates that age is not significantly related to the completion of 45 college level credits. It does indicate that students that are 21 and younger are ($\text{Exp(B)} 1.324$) 32% more likely to complete 45 college level credits than their peers who are 23 to 29. The findings further suggest that those students who are 30 or older are ($\text{Exp(B)} .957$) 96% less likely to complete 45 college level credits than 23-29 year olds.

**Race/Ethnicity.** In order to use appropriate coding for binary logistic regression students were identified in one of seven categories: African American, Asian, Hispanic,
Native American, Pacific Islander, White and Other. In this case all groups were coded against all students not in the identified group for example African Americans compared to all non-African Americans. This coding was done in order to appropriately structure data for use with binary logistic regression. Table 5 presents the findings of the logistic regression analysis for race/ethnicity.

Table 5

*Logistic Regression Results: Race/Ethnicity*

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>0.038</td>
<td>.932</td>
<td>1.039</td>
</tr>
<tr>
<td>Asian</td>
<td>0.734</td>
<td>.151</td>
<td>2.083</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.782</td>
<td>.261</td>
<td>2.185</td>
</tr>
<tr>
<td>Native American</td>
<td>-.859</td>
<td>.498</td>
<td>.423</td>
</tr>
<tr>
<td>Pacific Islander</td>
<td>-20.076</td>
<td>.999</td>
<td>.000</td>
</tr>
<tr>
<td>White</td>
<td>0.489</td>
<td>.205</td>
<td>1.603</td>
</tr>
<tr>
<td>Other</td>
<td>0.131</td>
<td>.834</td>
<td>1.139</td>
</tr>
</tbody>
</table>

* p<.05

While race/ethnicity did not indicate statistical significance the data indicates that both Native Americans and Pacific Islanders have negative Beta values of -.859 and -20.067 respectfully. This suggests that the direction of the odds ratio is negative for both groups and indicates that Native Americans are 42% less likely (Exp(B) .423) to reach 45 credits than non-Native American students. When considering the impact of this data it is important to note that the sample only included seven Native American students and
three Pacific Islander students. These low values are likely to impact the validity of this variable.

Students identified as Hispanic were 118.5% more likely (Exp(B) 2.185) to persist to 45 credits than non-Hispanic students and students who identified as “Other” were 13.9% more likely (Exp(B) 1.139) to achieve 45 college credits than non-Other students. However, both Hispanic (n=13) and Other (n=19) are both below the recommended sample size for logistic regression. Asian students were 108% more likely (Exp (B) 2.083) to complete 45 credits than non-Asian students. Finally, the logistic regression analysis for the category White has an odds ratio Exp(B) of 1.603 indicating that White students are 60% more likely to complete 45 credits than all non-White students.

**Enrollment status.** Enrollment status was also included as one of the demographic elements of this research. Students in this cohort were identified as either full time (12 credits or more) or part-time (11 credits or less) during their first quarter. First quarter enrollment was used due to research that suggests the importance of student behavior during the early quarters of enrollment (Pascarella & Terenzini, 1979).

Table 6

*Logistic Regression Results: Enrollment Status*

<table>
<thead>
<tr>
<th>Enrollment Status</th>
<th>B.705</th>
<th>Sig .005</th>
<th>Exp(B) 2.024</th>
</tr>
</thead>
</table>

*p<.05
The regression analysis indicates that enrollment status has a statistically significant relationship (Sig .005) to a student completing 45 college level credits. This indicates that in the case of enrollment status the null hypothesis would be rejected. The odds ratio further suggests that a full-time student who places below college level in mathematics, reading or English is 102% more likely (Exp(B) 2.024) to complete 45 college level credits than a student who is enrolled part-time.

**Socioeconomic Status.** The final demographic considered in this research is socioeconomic status. In order to examine this variable students were coded into one of three income levels based on the 2000 SES categories for Washington: low ($29,515 or less), medium ($29,515-47,) or high ($47,438 and above). For the purposes of logistic regression medium level was identified as the reference category.

Table 7

*Logistic Regression Results: Socio Economic Status*

<table>
<thead>
<tr>
<th>SES Low</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>-.076</td>
<td>.748</td>
<td>.926</td>
</tr>
<tr>
<td>High</td>
<td>.324</td>
<td>.178</td>
<td>1.382</td>
</tr>
</tbody>
</table>

*p<.05

The findings of the logistic regression indicate that income does not have a statistically significant relationship to the completion of 45 college level credits with significance values of .748 (Low SES) and .178 (High SES). The regression analysis does indicate that students in the low SES level are 93% less likely (Exp(B) .926) to achieve 45 college level credits than those in the medium income level. The data also reflects that students in the high SES quintile are 38% more likely (Exp(B) 1.382) to complete 45 credits than those in the medium level.
Research Question 3

What is the relationship between first quarter GPA and the persistence of academically underprepared students to 45 college level credits? For the purpose of this research students were coded into one of two groups. Those who completed the first quarter with a 2.0 or higher GPA and those whose GPA at the end of the first quarter was 1.99 or below. Students who complete each quarter with a 2.0 or above are considered to be making satisfactory academic progress according to the academic policy at Tacoma Community College. Those below a 2.0 are placed on academic warning.

Table 8

Logistic Regression Results: First Quarter GPA

<table>
<thead>
<tr>
<th>First Quarter GPA</th>
<th>B 1.810</th>
<th>Sig .000</th>
<th>Exp(B) 6.108</th>
</tr>
</thead>
</table>

*<.05

As seen in Table 8 the results of logistic regression indicate that there is a relationship between completing the first quarter with a 2.0 GPA or above but due to significance level (Sig .000) being so close to zero the existence of practically significant relationship is likely quite small. The odds ratio (Exp(B) 6.108) indicates that students with a first quarter GPA of a 2.0 or above are 511% more likely to complete 45 college credits than those students with below a 2.0 GPA during the first quarter.

Research Question 4

What is the relationship between the successful completion of a freshman seminar course and the persistence of academically underprepared students to 45 college level credits? Table 9 presents the binary logistic regression output for the
variable “completion of freshman seminar course”. In this case the Beta value was positive (B=.162) meaning that completion of a freshman seminar increased the likelihood of completing 45 college level credits.

Table 9

*Logistic Regression Results: Completion of Freshman Seminar*

<table>
<thead>
<tr>
<th>Freshman Seminar Completion</th>
<th>B.153</th>
<th>Sig .524</th>
<th>Exp(B) 1.165</th>
</tr>
</thead>
</table>

*p<.05

The results further indicate that there is not a statistically significant relationship between the completion of a freshman seminar course and achieving 45 college level credits. However the odds ratio (Exp(B) 1.165) suggests that students who successfully complete a freshman seminar course are 17% more likely to complete 45 college level credits than those students who do not complete a freshman seminar course.

**Research Question 5**

What is the relationship between participation in a learning community and the persistence of academically underprepared students to 45 college level credits?

The output for the binary logistic regression for “learning community participation” presented in Table 10 indicates that there is a positive relationship (B.630) between participation in a learning community and the completion of 45 college level credits. The significance level is greater than the established level of p.<.05 indicating that the relationship is not statistically significant. The odds ratio indicates that students who participate in learning communities are 88% more likely to complete 45 college level credits than those students who do not participate in learning communities.
Table 10

*Logistic Regression Results: Learning Community Participation*

<table>
<thead>
<tr>
<th>Learning Community Participation</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.630</td>
<td>0.054</td>
<td>1.878</td>
</tr>
</tbody>
</table>

*p<.05

**All Model Variables.** Table 11 presents the results of all nine independent variables. Beyond statistical significance the data presented in Table 11 is presented in ranked order of likelihood as identified by the Exp(B) value. When examining the entire model, there were only two variables that maintained a statistically significant relationship to completion of 45 college level credits. These were: full-time enrollment status (sig .005) and first quarter GPA (sig .000). Of these two the relationship between first quarter GPA and completion of 45 college level credits is the strongest.

The results of the logistic regression supports the fact that there is a positive relationship (sig .000) between completing the first quarter of enrollment with above a 2.0 GPA and the completion of 45 college credits. The second variable with statistical significance (sig.005) is enrollment status. This indicates that there is a positive relationship between the full-time enrollment and the completion of 45 college credits. Students who attended full-time during the first quarter of enrollment are 202% more likely to complete 45 college credits than those students who are enrolled only part-time during the first quarter.
Table 11

*Logistic Regression Results: Entire Model*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Quarter GPA</td>
<td>1.810</td>
<td>.000*</td>
<td>6.108</td>
</tr>
<tr>
<td>Enrollment Status</td>
<td>0.705</td>
<td>.005*</td>
<td>2.024</td>
</tr>
<tr>
<td>Ethnicity Hispanic</td>
<td>0.782</td>
<td>.261</td>
<td>2.185</td>
</tr>
<tr>
<td>Race Asian</td>
<td>0.734</td>
<td>1.51</td>
<td>2.083</td>
</tr>
<tr>
<td>Learning Community Participation</td>
<td>0.630</td>
<td>.054</td>
<td>1.878</td>
</tr>
<tr>
<td>Race White</td>
<td>0.489</td>
<td>2.05</td>
<td>1.603</td>
</tr>
<tr>
<td>SES High</td>
<td>0.324</td>
<td>1.78</td>
<td>1.382</td>
</tr>
<tr>
<td>21 and younger</td>
<td>0.281</td>
<td>.267</td>
<td>1.324</td>
</tr>
<tr>
<td>Freshman Seminar Completion</td>
<td>0.153</td>
<td>.524</td>
<td>1.165</td>
</tr>
<tr>
<td>Race Other</td>
<td>0.131</td>
<td>.834</td>
<td>1.139</td>
</tr>
<tr>
<td>Gender</td>
<td>0.017</td>
<td>.933</td>
<td>1.017</td>
</tr>
<tr>
<td>Race African American</td>
<td>0.038</td>
<td>.932</td>
<td>1.039</td>
</tr>
<tr>
<td>30 and over</td>
<td>-.044</td>
<td>.898</td>
<td>.957</td>
</tr>
<tr>
<td>SES Low</td>
<td>-.076</td>
<td>.748</td>
<td>.926</td>
</tr>
<tr>
<td>Developmental Level</td>
<td>-.180</td>
<td>.467</td>
<td>.836</td>
</tr>
<tr>
<td>Race Native American</td>
<td>-.859</td>
<td>.498</td>
<td>.423</td>
</tr>
<tr>
<td>Race Pacific Islander</td>
<td>-20.076</td>
<td>.999</td>
<td>.000</td>
</tr>
</tbody>
</table>

*p<.05
Beyond statistical significance the data presented in Table 11 is presented in ranked order of likelihood as identified by the Exp(B) value. When evaluating the model it is important to keep in mind that those indicators with a Exp(B) value of less than 1.00 suggest a negative likelihood. For example SES Low has a Exp(B) value of .926 indicating that a student in the lowest SES level is 92% less likely to complete 45 college credits than a student in the middle SES level. Inversely, the model identifies those variables with a Exp(B) value greater than 1.0 that indicate a greater likelihood of a student completing 45 college credits.

**Summary of Findings**

The current study used binary logistic regression to examine factors that support the persistence of academically underprepared community college students. Performing binary logistic regression on all nine independent variables resulted in several findings. The major findings of the current study were:

- The research identified a statistically significant relationship between first quarter enrollment status and the completion of 45 credits. The data indicates that full time enrollment is related to the persistence of an academically underprepared student completing 45 college credits.
- The current study also indicates a statistically significant relationship between first quarter GPA and the persistence of academically underprepared students. The data supports that a student who completes the first quarter with above a 2.0 GPA is statistically more likely to complete 45 college level credits.
- The results of the study do not identify a statistical relationship between
entering college two or more levels below college level and persistence to 45 college level credits. The data does suggest that students starting two or more levels below college level are 83% less likely to complete 45 credits than those students starting only one level below college level.

• Although the study did not indicate a statistical relationship between demographic variables of gender, age, race/ethnicity and socio-economic status among academically underprepared students who persist to 45 college level credits, data does suggest that students in the lowest SES level are 92% less likely to complete 45 college credits than those students in the medium level. The data further indicates that White students are 60% more likely to complete 45 credits than non-white students.

• The current study does not indicate a statistical relationship between the successful completion of a freshman seminar course and the persistence of academically underprepared students. It does indicate an increase in the likelihood that a student who completes a college success course will achieve 45 college level credits.

• This research does not support the existence of a statistical relationship between participation in a learning community and the persistence of academically underprepared students. It does however indicate that participation in a learning community increases the likelihood that an academically underprepared student will achieve 45 college level credits.

The findings identified in this chapter add to the body of current research about increasing the persistence of academically underprepared students at community colleges.
This research provides community college faculty and administrators additional information to support the persistence of academically underprepared students. The following chapter will provide a discussion of the findings and implications for college faculty and staff.
Chapter 5: Discussion of Findings

Research indicates that 42% of all students enrolling in community colleges are underprepared to succeed in college level courses and over half of these students do not persist to a certificate or degree (McCabe, 2000). This suggests that increasing the persistence of academically underprepared students is and will continue to be an essential role of the community college. Further research indicates that if one-third of the students taking at least one remedial course were to earn a bachelor’s degree, they would generate more than $74 billion in federal taxes and $13 billion in state and local taxes, while costing the taxpayer about one billion dollars to remediate (M. G. Spann, Jr., 2000).

Considering the current economic challenges in the United States, finding ways to increase the persistence of academically underprepared students at community colleges is of critical importance to both our students and our economy.

Educational leaders are consistently urging colleges to create a culture of evidence about the success or challenges that exist within community college (McCabe, 2003; Roueche & Roueche, 1994; Tinto, 1998). Colleges are strongly encouraged to use data in order to create a culture of evidence that colleges can use to set goals, review progress and improve practice (Community College Survey of Student Engagement, 2008). By examining this data colleges can identify the effect that intermediate attainments or momentum points such as the completion of a college success course, participation in a learning community, or completion of 30 or more college credits and their association with a higher probability of success (Jenkins, 2008). The following section will discuss the findings of this research within the context of these larger issues.
Factors With Relationships to Student Persistence

Student persistence or student retention has been a consistent topic of interest for both college leaders and researchers for years. Unfortunately most of the research has been conducted using traditional students at four-year institutions. This trend is starting to change, there is a growing body of research focused on student persistence specifically underprepared students conducted at the community college level (Boylan, Bonham, & Bliss, 1994; McCabe, 2003; Roueche & Roueche, 1999). This includes research that specifically addresses academically underprepared students and their progression through the institution (Boylan, Bonham, & Bliss, 1994).

The findings of this study contribute to this discussion by providing information on the persistence of academically underprepared students at a community college. Using binary logistic regression the current study identified that enrollment status, specifically full-time enrollment and first quarter GPA, both had statistically significant positive relationships to persistence of academically underprepared students at the community college.

Enrollment status. Results of the current study found that the variable “enrollment status” which evaluated the effect of full or part-time enrollment during the first quarter had a statistically significant relationship to persistence of academically underprepared students. These findings support several other studies (Bean & Metzner, 1985; Brooks-Leonard, 1991; Feldman, 1993) that indicate that enrollment status is a predictor of persistence. Specifically, research conducted by (Feldman, 1993) indicated that part-time students were 2.23 times more likely to drop out than full-time students.
The impact of full-time enrollment during the first quarter may suggest that students who are enrolled full time are more engaged during a critical period as they become academically and socially part of the campus culture. The importance of student engagement and academic and social integration during the early quarters of enrollment are key elements in increasing student persistence (Pascarella & Terenzini, 1979; Tinto, 1993). For part-time students increased levels of student engagement may be a challenge due to the amount of time they are actually involved in academic or social activities on campus. This factor may be even more significant for those students who are both part-time and academically underprepared (Adelman, 2006) as both of these factors are related to an increase in the likelihood that a student is at risk of not persisting to 45 college credits.

First quarter GPA. Academic performance during the first quarter was identified by the current study to have a statistically significant relationship to the completion of 45 credits. The findings identified that a student that receives a 2.0 or above was 511% more likely to persist to 45 college level credits than a student who had below a 2.0 GPA during their first quarter. This study correlates with other research (Bean & Metzner, 1985; Brooks-Leonard, 1991) that identifies grade point average as a consistent and powerful predictor of persistence. The focus on the first quarter GPA is supported by recent research by Driscoll (2007) that specifically identifies the first semester as a critical point in students academic careers.

These findings suggest that GPA during the first quarter is a predictor of persistence and an indicator of the level of academic engagement during the first term of a student’s enrollment. Students’ lack of academic integration can happen for a variety of
reasons. Research indicates that low GPA during the first quarter has a negative impact on a student’s belief that they can be successful as they continue their education (Kreysa, 2006; Nora, NA). Students who enter community college below college level may already feel marginalized by their own under preparedness; add to this low academic success (GPA) during the first quarter and students are less likely to feel any sense of confidence that they can be academically successful. One possible way to increase student’s academic confidence is to create courses that contain curricular scaffolding. Scaffolded instruction is the systematic sequencing of content, materials, and tasks combined with and teacher and peer support to optimize learning (Dickson, Chard, & Simmons, 1993). An example of this is creating a developmental English course divided into units. Each unit could represent one skill that a student needs to acquire prior to advancing to the next. This type of course may or may not be confined to a regular quarter system, thus allowing students to move at their own pace and build a sense of academic confidence as they achieve the individual skills required in each unit. A student in this type of course may also be required to participate in one-on-one or group tutoring sessions designed to increase skills and build confidence. The combination of increased skill level and confidence has the potential to increase students GPAs and their motivation to persist in college.

Another reason may be that students do not see the relevance of the courses that they are taking. This suggests a need for instructors to consider ways to help students understand ways in which topics have use or relevance to a student’s current or future life or career. Another possibility for low GPA during the first quarter is that the instructional methodology used in the classroom does not allow for the different learning styles that
students have. Instructors may want to consider strategies such as Universal Design for Learning that helps instructors move beyond a one size fits all teaching method in order to expand learning to accommodate a variety of learning styles (CAST, 2010). By increasing students academic confidence, creating curricular relevance and using instructional methodologies that engage multiple learning styles institutions may increase the likelihood increased GPA during the first quarter and the persistence of academically underprepared students.

**Other factors.** Although this research only identifies only two elements as having statistically significant relationships to the completion of 45 credits the data does indicate several other variables with high odds ratios that suggest a possibility that they influence the persistence of academically underprepared students and should be considered by practitioners at community colleges.

**Developmental level.** The first variable that is indicated in this research as not having a statistically significant relationship to the completion of 45 credits but a high odds ratio is the negative relationship between entering community college two or more levels below college level in mathematics, reading, or writing and the completion of 45 credits. This relationship is identified by the negative beta value (-.180) and the odds ratio (Exp(B) .836) which suggests that a student who starts college two or more levels below college level is 83% less likely to complete 45 credits than a student who starts college only one level below college level. This trend is supported by research conducted by Adelman (2006) and Hawley & Harris (2005) that indicates that one of the strongest predictors of attrition is the number of developmental courses a student is required to take. This is largely attributed to the fact that students who are required to complete
multiple developmental courses prior to beginning to take college level credits feel defeated and that they may not be able to be successful in college level courses (Long & Amey, 1993; Nora, NA). An example of this is the 30 year-old student who must enroll in a course called Math 10 when they are aware that college level begins at 110. Thus, even the way institutions label courses can add to the sense of defeat a student may feel. Colleges may want to consider the way in which courses are numbered or named in order to create positive student perceptions. Research indicates that as the number of credits successfully completed increases GPA simultaneously increases as well (Long & Amey, 1993). This suggests the need to build a students’ academic confidence is important during the first quarters of enrollment.

**Demographic data.** Other important trends identified in this research are the results of demographic data that indicates that White students are 60% more likely to complete 45 credits than non-white students and that students in the lowest socioeconomic levels are 92% less likely to complete 45 credits than those students in the medium income level. This supports several other studies (Boylan, Bonham, & Bliss, 1994; Clery, 2006; McCabe, 2000) that suggest the need to focus efforts that support academically underprepared students, specifically students of color and students from the lowest income levels in order to increase the persistence of these students and close the achievement gap.

Research identifies a gap in college enrollment in both students of color and students from lower socioeconomic backgrounds when compared with White students from middle incomes (Bowen, Kurzweill, & Tobin, 2005). Research indicates that only 54% of high school graduates from the lowest income levels enroll in college compared
to 82% in the middle and upper income levels (Bowen, Kurzweill, & Tobin, 2005).

Research on college enrollment by race/ethnicity only adds to the gap. Data indicates that in 2001 65% of White 16-24 year old students enrolled in college compared to 55% of African Americans and fewer than 50% of Hispanics in the same age group. The minority enrollment gap is primarily a result of the fact that underrepresented minority students are more likely than other students to come from low-income families. In 2003 8.9% of White families with children lived below the poverty level compared to three times as many African American and Hispanic families 28.6% and 25.2 % respectively (Bowen, Kurzweill, & Tobin, 2005). Income level is related to college preparedness. Research suggests that children whose parents have higher incomes have access to better quality primary and secondary schools and are thus better prepared for college (Bowen, Kurzweill, & Tobin, 2005). The existence of a gap in college preparation is illustrated by data that suggests that in 1993 the majority (67%) of students enrolled in developmental education were White. African Americans represented 23% and Hispanic students were 6% of the developmental education population, while Asians represented 3% and Native Americans represented 1% of the population. What is important to note about these statistics is that in this study racial/ethnic minorities represented about 9% of America’s college students at this time, but accounted for 23% of the developmental population clearly indicating that racial/ethnic minorities are overrepresented in developmental education programs (Boylan, Bonham, & Bliss, 1994).

This finding combined with other research that suggests significant population growth in current minority groups during the next 40 years (McCabe, 2000), further indicates the need for community college administrators and federal educational policy
makers to increase efforts to achieve greater educational equity in the United States. This not only provides better futures for low income and minority students and families it also strengthens the nation’s ability to be successful in the global economy. One way for colleges to strengthen their efforts is to consider instructional strategies that show positive impact on academically underprepared student persistence.

Two other factors identified in the research suggest positive impacts of instructional strategies designed to increase the persistence of academically underprepared students. These strategies are completion of a first year seminar course and participation in learning communities.

First year seminar. The findings of this research indicate that completion of a first year seminar course increases the likelihood of persistence by academically underprepared students. This is supported by the findings of other research (Barefoot & South Carolina Univ, 1993; Jenkins & Wright, 2008; Keenan & Gabovitch, 1995) that indicates that first year seminars are effective institutional strategies for increasing student persistence. The success of first year seminars is attributed to a variety of factors that may resonate with the different needs of students enrolling in the course. Many first year seminars focus on issues and skills students face as new college students such as time management, academic planning, awareness of college resources, development of self-confidence and the value of continued education (Barefoot & South Carolina Univ, 1993; Jenkins & Wright, 2008). While first year seminars may differ in focus and teaching methodology research suggests that the common purpose is to establish a forum for students to conduct serious inquiry into what they can do to make their academic
experience more successful (Barefoot & South Carolina Univ, 1993) and to foster a students academic and social integration to the college culture (Tinto, 1993).

Since none of this later research was conducted on specifically academically underprepared students, this study adds to the body of research on first year seminars by focusing on the impact of a first year seminar course on academically underprepared students. This research indicates that academically underprepared students who complete a first year seminar course are 15% more likely to complete 45 credits than those who do not complete a first year seminar.

**Learning community.** Another trend that was identified in this research is the positive impact participation in a learning community has on student persistence for the student sample in this study. This trend supports research done by Tinto (1997, 1998) and Minkler (2002) whose research resulted in similar findings.

Tinto (1997) indicates that students report three key elements that link learning communities with student persistence: (a) building supportive peer groups, (b) creating shared learning and (c) gaining a voice in the construction of knowledge. Students indicate that participation in learning communities during early quarters of enrollment helped students develop a supportive group of peers that helped them integrate into the college community. Learning communities also helped students form a bridge between the academic and social aspects of college. Groups that often formed within the class often extended beyond the classroom in informal social meetings and study groups. Finally, students indicate that participation in a learning community challenged them to become personally involved in determining what they knew and how they knew it (Tinto, 1997). This type of personal involvement is achieved by students’ constant interaction
with their peers and faculty, giving and receiving feedback, sharing and questioning points of view and by doing so, further developing their own perspective and academic confidence.

However, the populations used by Tinto (1997) and Minkler (2002) did not focus on academically underprepared students. The research conducted in this study adds to the body research by focusing specifically on academically underprepared students and indicating that academically underprepared students that participated in a learning community were 89% more likely to complete 45 credits than academically underprepared students that had no participation in learning communities.

Use of these learning strategies should be considered in conjunction with the findings of this research that suggest the impact of first quarter GPA and enrollment status. Together these findings indicate the need for colleges to apply these types of instructional strategies during the first quarters of enrollment in order to strengthen the possibility of student persistence and success. Further discussion of this is provided in the Implications section of this chapter.

Study Limitations

The findings of this study identified a statistically significant relationship between several factors that support the persistence of academically underprepared students at community colleges as well as identified several trends in the data. However, due to the use of quantitative methodology, specifically logistic regression, no conclusions of cause and effect can be drawn. The findings of this research only indicate if a relationship exists between specific factors and outcome. These findings should be used to form hypothesis for future research using experimental or quasi-experimental methodology.
A second limitation of this finding is the sample size and scope used for this research. Although research (Lawley & Maxwell, 1971; Marascuilo & Levin, 1983; Tabachnick & Fidell, 2001) indicates that the sample size used for this study was appropriate several factors included, specifically race/ethnicity would have benefited from a larger sample. Another way to increase the depth of data provided by this research would be to consider including cohorts from more than one community college. One way this might be accomplished is to use state-wide data or identify colleges from several states using similar samples and instructional methodologies.

Another limitation of the current study is the narrow focus of factors considered, specifically demographic and institutional. As discussed earlier research on the persistence of students in higher education has identified a wide variety of factors that influence the persistence of students in post secondary education (Bean & Metzner, 1985; Brooks-Leonard, 1991; Tinto, 1993) including academic performance in high school, family support, and environmental factors. This study focused on available data that research indicated has an impact on the persistence of academically underprepared students at a community college. Because of the existence of a wide variety of factors affecting persistence some may view this as a limitation of this research.

Implications for Practice

This research indicates a relationship exists between a student’s first quarter GPA being above a 2.0 and the successful completion of 45 college level credits by academically underprepared students in their first quarter of enrollment at a community college. This finding suggests that community colleges should focus specific effort on the front door of the college including college orientation programs, initial advising
practices and specific curricular pathways designed to increase persistence during the first quarter of enrollment. One possible example could be to create a learning community designed specifically for academically underprepared students during their first quarter. Curriculum could include a freshman seminar course, a course in the area the student is underprepared and a communication or sociology course. This type of curricular pathway could provide an academically underprepared student with a good way to become more socially and academically integrated to the college while also helping the student to build more self-confidence. It may also be important to continue this type of cohort through a student’s first three quarters of enrollment for this type of strategy to be truly effective.

Community colleges should also consider collaboration between faculty and student services staff, specifically academic advisors, to create early alert systems. This type of system could be used during early quarters of enrollment to identify students who are academically struggling and provide timely intentional support when needed. The early alert system at Sinclair Community College (E. Price, 2009) is a good example of a system designed to use technology to foster communication between students, faculty and advisors to identify potential problems and provide students the support and resources necessary to address problems. Sinclair Community College has implemented an electronic form that is completed by a faculty member. This form identifies a student as having difficulty in areas such as: (a) excessive absences, (b) academic concern, (c) low homework scores, (d) low test scores, (e) personal concern or (f) other. This form is electronically sent to the advisor assigned to the student. The advisor then contacts the student and creates an action plan that includes the campus resources available to help the
student with the identified challenge. By using software designed to facilitate the early alert process the faculty member, student and advisor receive electronic updates on the student’s progress. This type of early alert process creates a team centered approach to student retention. It also is less time consuming and effectively tracks and records information as well as updates faculty and staff throughout the process. This early alert process also helps to build a culture of evidence by creating detailed reports about the effects of early alert on student success.

Full-time enrolment was also shown to have a relationship to the completion of 45 college credits by academically underprepared students. This research indicates that students enrolled full-time (10 credits or more) are 102% more likely to complete 45 college credits than students enrolled only part-time. This has implications on both the institutional level and on public policy. At the institutional level the positive impact of full-time enrollment suggests that colleges should consider ways to structure course offerings that support full-time enrollment. Possible options include the use of hybrid and online courses as well as considering scheduling that allows students to only attend two to three days per week rather than one hour blocks Monday through Friday. Another option is to offer degree pathways focused at students who are only able to attend night and or weekend classes.

The findings of this study indicate that academically underprepared students who are attending part-time are less likely to persist. This suggests that colleges may want to consider ways to provide support specifically designed for these students. One possible strategy is to establish services such as online advising or tutoring programs that provide students access to theses support services on their schedule and extend beyond the regular
8:00 a.m.-5:00 p.m. hours a college is traditionally open. Colleges may also need to consider having more services open in the evening and on weekends to meet the needs of these students. It is also important that students who access college services online or during the evening or weekends receive the same level of service that a student receives during the typical workday. This may involve scheduling some full-time staff to work evenings or weekends as part of their regular schedule or possibly providing more training for staff working in the evenings or on weekends.

The findings of this research indicate that students who start community colleges two or more levels below college level are 84% less likely to complete 45 college credits than those who start only one level below college. This finding suggests that institutions should develop retention strategies that focus on early and intentional interventions that support academically underprepared students. In order to close the achievement gap and create better educational equity attention should be given to increasing the persistence of students of color and students in low income groups.

One possible intervention is to create a Summer Bridge or Jump Start program designed to improve students’ skills prior to their first quarter. This time could be focused on specific remediation needed in mathematics, reading or writing dependent of the individual students needs. This skill improvement could also be paired with a first year seminar course to prepare a student for the nature and rigor of college level courses. This type of program could be designed as a learning community or cohort program possibly grouping students by area of remediation, age or possibly race/ethnicity or gender. For example, a program could be specifically designed to support and engage academically underprepared African American males as they begin their college experience. Key
program elements could include creating student connection to staff and faculty of color, instructional methodology that is collaborative and designed to demonstrate relevance of content, and experiences designed to develop students’ self-confidence.

This study also supports the use of a first year seminar course as a way to increase the likelihood of persistence of academically underprepared students. If community colleges are truly dedicated to supporting academically underprepared students they should consider the possibility and accompanying impact of making these courses mandatory as most college students do not register for courses deemed to be optional.

First year seminar courses that employ interactive learning pedagogy and focus on study skills, critical thinking, introduction to college resources and time management strategies provide solid foundations for underprepared students entering community colleges. First year seminar courses could be used either as a standalone course or as part of learning communities designed to support the persistence of academically underprepared students. One example of using a first year seminar to address the needs of a specific group would be to create a first year seminar course for students 30 years of age or older.

Another instructional strategy identified in this research shown to have a positive relationship to increasing the persistence of academically underprepared students at a community college is the use of learning communities. Research (Gabelnick, MacGregor, Matthews, & Smith, 1990; Minkler, 2002) suggests that learning communities involve the deliberate structuring of curriculum to actively engage students in both course content and creation of sustained relationships with students and faculty. In order for learning communities to meet the needs of academically underprepared students special attention should be paid to the design of these courses. Curriculum
should consider factors such as the academic area and level a student is underprepared, possible implications related to age, gender, and racial background of students in the course and use of instructional methodologies designed to engage students and foster self confidence. One possible way to structure this type of learning community is to create learning communities for specific groups such as Hispanic students or female students. This type of grouping would allow faculty to specifically design curriculum to address the unique needs of different groups of academically underprepared students.

While using learning communities in stand-alone quarters has shown some success, the use of learning communities should be considered as part of a multi-quarter pathway for academically underprepared students. This type of curricular pathway design has the potential to provide greater structure and student engagement for underprepared students during early quarters of enrollment. This type of strategy combined with creating structured curricular pathways designed to increase students’ persistence could not only be of value to students but also to college administrators as they consider allocation of resources that support student success. One possible example could be a three-quarter learning community that is specifically designed for academically underprepared students who enter the college two levels below in mathematics. The first quarter could include a freshman seminar course, the first level of math and a communication course. The second quarter could include the second level of math, a humanities course and a social science course. These courses could be designed to demonstrate linkages to the mathematics being taught during that quarter. The third quarter could include the first college level mathematics course a music or art course and possibly a anthropology or biology course once again designed to illustrate the relevance of course content and foster the academic
and social integration of academically underprepared students. Upon completion of this type of pathway, a college could consider giving a certificate or some type of recognition designed to continue to build a student’s confidence and encourage persistence.

This research provides a model of how institutions could begin to create a culture of evidence suggested in other research (McCabe, 2003; Roueche & Roueche, 1994; Tinto, 1998) that identifies the challenges and successes at community colleges as they work to support the persistence of academically underprepared students. Many of the questions that serve as the basis for this research are identified by Robert McCabe in his book, *Yes We Can!* (2003). The questions included in this research also are intended to align with the Milestone model designed by Leinbach and Jenkins (2008) that uses student transcript data and student characteristics as resources to better understand student progression and achievement. Although the data contained in this study is in no way meant to tell the entire story it is intended to serve as a foundation on which institutions could design further research to identify barriers as well as factors that support the success of academically underprepared students.

**Areas for Future Research**

Due to the quantitative nature and methodology (logistic regression) used to conduct this research its focus was directed at identifying what relationships exist that affect the persistence of academically underprepared community college students. Institutions could benefit from future research that focused on why the relationships exist and add to the depth of understanding needed to increase the persistence of academically underprepared students. For example, research (Adelman, 2006) suggests that the more
developmental education courses a student is required to take the less likely they are to persist. By conducting qualitative research with students requiring three or more developmental courses who did not persist beyond the first quarter colleges may be able to identify themes or trends that lead to a student’s withdrawal. By identifying possible reasons why students withdraw colleges may be able to create ways to better support or engage students and increase persistence.

As stated in Chapter 3 the current study was conducted from a post-positivist perspective. Application of the post-positivist framework suggests that research should be quantifiable, generalizeable and reproducible (Trochim, 2006; Vogt, 2007). Schutt (2006) further suggests in order to achieve intersubjective agreement research needs to be replicated repeatedly testing explanations against hard, objective facts. Because the current study was conducted within the post-positivist framework future research should be focused on replicating its findings.

Future research could be conducted on a larger scale. One way this research could be conducted is to expand the population to include all the community colleges in Washington or other states. Future research would benefit from the use of oversampling specifically in areas in which this research had low n values (Hispanic students, Native American students). Conducting research on a larger population could increase the applicability of logistic regression by increasing the sample sizes identified for each variable. Other long term qualitative studies should be conducted with developmental education students who left the college prior to degree completion to understand more of their lived experience and to provide college administrators more information about the student perspective. Specific emphasis could be placed on the timing or circumstances of
departure of academically underprepared students. This data could also include any themes that may be connected with age, race/ethnicity, or socioeconomic level.

The research also indicates that many students enroll in college part-time and are employed full time (Bean & Metzner, 1985). Future research should seek to better understand the challenges faced by academically underprepared part-time students and in what ways their college experience may differ from their peers attending full time. One specific factor that could be considered is patterns in the time of day these students are attending or if they are enrolled in courses offered online. This type of research could provide college leadership valuable insights into how to provide better support to part-time students or online students and guidance in to how to structure support programs.

Research indicates that the number of developmental education courses a student is required to take has a negative impact on persistence (Adelman, 2006). Further research that examines the relationship between the subject areas in which a student is underprepared in and the completion of a certificate or degree would help to inform the creation of better curricular pathways for underprepared students. For example, if a student is underprepared in reading it may be important to address this before other areas, as a student’s inability to read will have an impact in all other academic areas. An illustration of this is the student who is not able to read and understand the problems in a math or science course and performs poorly in this course due to an inability to read at the necessary level.

Other relevant research that could be conducted in the future includes the application of Tinto’s (1993) Student Integration Model focused specifically on academically underprepared students at a community college. A study of this nature
would add to the current body of knowledge by considering how student integration may change based on a student’s academic readiness for community college level work. Other possible frameworks that could be considered are based on research done by Pascarella and Terenzini (1983) and Spady (1970) that focus on specifically the first year of enrollment. These could be conducted with a focus on the first two quarters of community college for academically underprepared students. Other research that could be similar is the application of the study conducted by Karp, Hughes and O’Gara (2008) that identifies the importance of information networks that help students learn and become comfortable with the campus and by doing so support the persistence of community college students. An example of a possible research question could be, what are the ways students receive information that help them become more integrated to the campus culture during the first quarter of enrollment. This information has the potential to help college administrators to better understand how and where students receive information during early quarters of enrollment and then consider ways to use information networks to better support academically underprepared students.

First year seminar is another area that further research would be beneficial. Research that focused specifically on academically underprepared students would be a critical addition to the current body of available research. Research that would focus on the topics included in the course or offer research grounded models for community colleges would provide much needed information for community college practitioners. This research could build on the research by Jenkins & Wright (2008) that demonstrated positive effects on first quarter GPA and improved retention when students participate in
a first year seminar course. Research in this area would also benefit from a more qualitative method that provided student voice to be heard in research.

Participation in a learning community showed a positive impact on the likelihood that academically underprepared student would achieve 45 college credits, however, more research in this area would be of value to community college practitioners. Specific research that expands on the work done by Tinto (1998) that includes developmental studies is necessary to help identify successful course groupings and identifiable pathways for students. Identification of appropriate learning communities and curriculum pathways that demonstrate increased persistence would provide possible models for other institutions to consider.

The preceding section proposed additional areas for further research in the area of increasing the persistence of academically underprepared community college student. This supports the post-positivist belief that knowledge is accumulated by repetition and the use of multiple perspectives. Another concept that exists within the post-positivist framework is that of researcher bias. I acknowledge that my personal background, beliefs and knowledge that I have about community colleges and persistence of academically underprepared community college students, along with the findings of the current study, combine to create the conclusions and implications for practice presented in the preceding section.

**Conclusion**

Increasing the retention, persistence and ultimately the completion of community college students has critical implications for students, community colleges and our nation. Continuing shifts in the global information and technology based economy are
making degrees and certificates essential to enter and maintain a place in the workforce of the twenty-first century. This new economy has the potential to offer prosperity to many Americans, but for those who are entering community college academically underprepared community colleges are essential pathways to prosperity. For the past decade much of the emphasis at community colleges has been placed on the need for access to the institutions. Yet it is now clearer than ever that access without success is nothing more than a hollow promise. This research is aimed at continuing to add to the body of work that provides direction for community college practitioners as they work to increase the persistence and completion rates of academically underprepared community college students.

Recently, President Obama hosted a community college summit and challenged community colleges to produce an additional five million graduates by 2020 (White House, 2010). In an effort to meet that challenge six of the leading national organizations including The American Association of Community Colleges and The Association of Community College Trustees, signed “A Call to Action” which challenges community colleges to increase the total certificates and degrees awarded to students by 50 percent by 2020. This shift in the national agenda from a focus on access to one of access and completion further supports the need for community colleges to actively engage in efforts to identify strategies that support the persistence and completion of increased number of students. This research indicates that students from low income families and students of color who are entering community colleges academically underprepared are some of the highest risk students that community colleges serve. This research demonstrates a relationship between a students first quarter GPA and full-time enrollment and
completing 45 college credits. The findings of this research further indicate that strategies such as focusing intentional support on the front door and first quarter, requiring a freshman seminar course and developing learning communities do increase the likelihood that academically underprepared students will complete 45 college level credits and increase the potential that they will complete a certificate or degree.

It is my hope that this research has made a contribution to existing research that demonstrates the need for community colleges to focus significant efforts evaluating factors and creating strategies that increase persistence and ultimately the completion of those students entering the college academically underprepared to succeed in the global twenty-first century workforce. I believe that this work is truly one of the core missions of community colleges and is at the heart of the transformative nature of education that is essential for the continued prosperity of students, communities and nation.


Hawley, T., & Harris, T. (2005). Student characteristics related to the persistence for first-year community college students. College Student Retention, 7(1-2), 117-142.


McCormick, A. (1999). *Credit production and progress toward the bachelors degree: An analysis of postsecondary transcripts for beginning students at 4-year institutions.* Washington D.C.


Spady, W. G. (1970). *Dropouts from higher education: An interdisciplinary review and synthesis*: Interchange. *Volume 1, Number 1*, 64-85,


