EXPLORING THE RELATIONSHIP BETWEEN STUDENT BACKGROUND CHARACTERISTICS AND COLLEGE PERFORMANCE INDICATORS WITH LEARNING COMMUNITY STUDENT PERSISTENCE

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Abstract

The purpose of this study was to explore the relationship between student background characteristics and college performance indicators with learning community student persistence. The learning community design was tailored for students who required remediation in both math and English. The research site was a rural community college located in the northeastern United States. The sample included 424 students who enrolled in this learning community during their first semester in college. Binary logistic regression techniques were used to examine both the direct association and interactive association of select theoretically relevant variables with student persistence. The direct associations tested in this study representing student background characteristics (e.g., age, race/ethnicity, gender, high school GPA, and receipt of financial aid) were included in various models, along with select college performance indicators (e.g., pass remedial math course, pass remedial English course, pass student success course, and college GPA), in relationship with the likelihood of future semester persistence. Interactive variables were introduced representing combinations of student background characteristics and college performance indicators to explore the effects additional variables have within the models. Results indicated passing the required remedial coursework, particularly the math and the student success course, are important in improving the likelihood of persistence. Discussion focused on improving remedial education successful course completion, early identification of students underperforming, and possibilities for methodological replication.

Keywords: learning communities, student persistence, developmental education, community college
Dedication and Acknowledgements

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Chapter 1: Introduction

Problem of Practice

In October 2010, community colleges took center stage at a White House Summit on Community Colleges. Dr. Jill Biden led this summit, and in alignment with President Obama’s National 2020 goal to increase the number of citizens in the United States who have a college degree, workforce training and the role of community colleges in reaching this goal were under the spotlight. Given the call to reach this goal, community colleges were expected to see increased numbers of students enrolling, representing many different backgrounds and skills. The varying levels of readiness and the diverse needs of these students will result in challenging work for community colleges in order to serve these populations well, resulting in high levels of completion or goal achievement (Romano, 2011).

Community Colleges serve over half of all undergraduate students in the United States (American Association of Community Colleges, 2011). Nearly half of all community college students are not retained (Schuetz, 2008) and many are leaving as early as their first semester in college (McClenney, 2007). One contributing factor to community college student attrition is the number of students in need of remediation. According to Roueche and Waiwaiole (2009), over 40 percent of community college students require remediation. Remedial education courses are most often associated with reading, writing, and mathematics (Roueche & Roueche, 1999). As a result of these deficiencies, too many students enrolling in community colleges are not persisting or reaching their goals. Although remedial education (also commonly referred to as developmental education; the terms are used interchangeably throughout this study) has been researched as it relates to student persistence at community colleges, studies have suggested that future research is needed (Bailey, 2009; Fike & Fike, 2008; Grubb & Cox, 2005) because
students in need of remediation are still not persisting at a rate of those who do not require remediation. Student persistence is defined as continuation of enrollment of the student (Wolfle & Williams, 2014).

Beyond the high percentage of students attending community colleges who require remediation, literature has suggested that the kinds of students enrolled at community colleges differ significantly from those enrolled at four-year institutions (e.g., Cohen & Brawer, 2008; Fike & Fike, 2008). The community college student population has a higher percentage of adult learners, women and minority students (Cohen & Brawer, 2008), as well as underprepared students, compared to more selective colleges and universities (Cho & Karp, 2013). Student background characteristics (e.g., race, gender, age, high school achievement) have been empirically linked to student persistence (Bremer et al., 2013; Cho, 2011; Fike & Fike, 2008) and are important to understanding the effect background characteristics have on how students integrate into the college environment (Tinto, 1987a).

Considering the background characteristics students represent, once students enroll in either a 4-year institution or a community college, their levels of readiness or needs of remediation can influence the likelihood of future persistence. At community colleges, nearly half of all remedial students do not successfully complete their first semester remedial course, and many of those students drop out during their first semester from college (Bailey, Jeong, & Cho, 2010). Given the uniqueness of community college students’ background characteristics compared to the characteristic of students enrolled at four-year institutions, as well as the high percentage of community college students needing remediation, further research is needed examining the impact community college student characteristics have on developmental student retention (Fike & Fike, 2008).
Researchers have investigated developmental education to better understand the effects on students’ persistence and graduation rates of participating students (Bahr, 2012; Bailey, 2009; Boylan, 2009; Cho, 2011; Crews & Aragon, 2007; Kolajo, 2004; Perry, Nahr, Rosin, & Woodward, 2010). Institutions have looked at programming or various interventions to implement to improve persistence of students in need of remediation. One example is the development and offering of learning communities for students in need of remediation (Barbatis, 2010). A learning community is generally defined as a grouping of two or more classes which a cohort of students will enroll in as a community. Learning communities can also be used as a form of intervention to improve college transitions.

The use of learning communities has steadily increased over the last twenty years in higher education (Love, 2012). The results of learning communities designed for students enrolled in remedial classes at four-year institutions and community colleges have been positive, resulting in higher level of persistence and completion (Barbatis, 2010; Boylan, 1999; Bailey, Jeong, & Cho, 2008; Burley, Butner, & Cejda, 2001; McCabe, 2003; Roueche & Roueche, 1999). Students in learning communities have also been found to outperform non-learning community student participants academically (Brittenham et al., 2003; Knight, 2003; Raftery, 2005).

Although remedial education has been extensively researched as it relates to students’ persistence and in institutional retention rates at four-year institutions, future research is needed, specifically focusing on community college students enrolled in developmental learning communities (Bailey, 2009; Fike & Fike, 2008; Grubb & Cox, 2005). Future research should focus on community colleges by determining preexisting factors that could be identified on initial enrollment, for practitioners to implement improved supports. Wolfle (2012) called for
additional research to better understand the persistence of students who require remediation. Given the high attrition rates for students who require remediation in community colleges (Fike & Fike, 2008), consideration for how students are performing in college is also important to understanding the relationship of academic performance with persistence. Also, with the successes of learning communities that have been identified in prior literature (Barbatis, 2010; Boylan, 1999; Bailey et al., 2008; Burley et al., 2001; McCabe, 2003; Roueche & Roueche, 1999; Knight, 2003; Raftery, 2005), this study examined the relationship of student background characteristics and college performance indicators with persistence of participants in a developmental education learning community.

**Purpose of the Research**

Most of the prior research related to learning communities has focused on the effect the learning community has on student persistence in comparison to non-participants and because most of the significant findings related to learning communities effects on persistence have been positive (Barbatis, 2010; Boylan, 1999; Bailey et al., 2008; Burley et al., 2001; Roueche & Roueche, 1999; Weisman, Cullinan, Cerna, Safran, & Richman, 2012), this study extended the literature by investigating the relationship between students’ background characteristics and indicators of college performance with developmental education learning community student persistence. The learning community design included students who required remediation in both math and English, and an intensive student success course upon first semester enrollment in college. No previous research has included a learning community designed specifically to include these courses all at one time. In addition, most research examined the effects learning communities have had on student persistence as pedagogy or from the perspective of an intervention. This study concentrated on the students enrolled in the learning community, and
explored the relationships their background characteristics and college performance had on predicting the likelihood of persistence. Students’ persistence was defined as continued enrollment in the subsequent Spring semester (e.g., Fall-to-Spring) and enrollment in the third subsequent (e.g., Fall-to-Fall) semester following initial enrollment in the college.

**Significance of the Research**

The importance of this inquiry was to better understand the relationship between students’ background characteristics and college performance indicators with learning community students’ attrition being critical for many reasons. The learning community in this design is offered to first-time, full-time students who are required to complete a remedial course in both math and English. Given that the majority of students who enroll in community colleges require some level of remediation, either in math and/or English (Bailey et al., 2010; Perry et al., 2010), understanding the relationship students’ background characteristics and college performance indicators have when considering the likelihood of persisting in college was important. The other area of importance for consideration was that students’ characteristics have been correlated with not only student degree completion, but with the need for initial remediation when students enroll in the first place (Perry et al., 2010).

This research was also significant from a practitioner’s perspective. If colleges can understand how the different types of students representing various background characteristics relates to learning community persistence, improved and customized programs or services could be developed to address attrition for a more targeted group beyond just those who require remediation. Additionally, the investigation of interactive variables, representing these individual characteristics and indicators will fill a gap in literature and build upon previous
research which only examined the direct associations or effects (Bremer et. al., 2013; Fike & Fike, 2008).

**Research Questions**

Given the large number of underprepared students enrolling in community colleges annually and the public sentiments for community colleges to increase the percent of graduates, this study investigated the relationship between students’ background characteristics and college performance indicators and the persistence of participants enrolled in a developmental education learning community. In reference to the second research question, this study examined the conditional relationships multiple variables representing students’ background characteristics and college performance indicators have on persistence of students who participated in a first semester learning community. This study extended the literature by investigating the following research questions:

1. Is there a relationship between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) with the persistence of students enrolled in a learning community?

2. How do interactions between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) relate to the persistence of students enrolled in a learning community?
Positionality Statement

My interest in this problem of practice and purpose to explore student characteristics and community college success indicators on students’ persistence, was twofold. First, as a community college executive, I believe the college’s responsibility is to have a deep understanding of their students’ demographics. This understanding is important and should be considered in the creation of intentionally designed services and learning opportunities for students, not only to improve persistence, but also with the hope of improving academic progress and achievement.

Secondly, earlier in my career I participated as a faculty member working with remedial students and I observed significant attrition during their first semester enrolled at the college. I believe students who enroll in a community college do so with certain goals and expectations, and the institution’s responsibility is to support students on their paths to goal achievement and to meet their expectations as their institution of choice. Research focused on community college students’ demographics, specifically focused on developmental students, would be meaningful for a large percentage of open access institutions’ student bodies, and could lead to an improved awareness that retention strategies and instructional design can be developed in a smarter, and hopefully, a more effective way. These improvements would not only serve the students well, they would also have a positive effect on the institution from the perspective of student enrollments, budget, and student outcomes. Although I have these beliefs, this study used institutional data and was quantitative in nature, minimizing any bias reported in the results.

Theoretical Framework

Theory of student integration. The theoretical framework for this study is Tinto’s (1993) model of student integration, which was originated from Tinto’s seminal work in the
student departure model (1975; 1987a; 1987b; 1993). This model emphasized student background characteristics prior to enrollment in the college, as well as the role of integration, both academically and socially, on campus. From this lens, persistence is a longitudinal process of interactions with faculty and experiences within the classroom, as well as with peers and experiences outside of the classroom (Tinto, 1993). The more positive interactions a student has, the stronger commitment he or she will have towards persistence and completing college. Students who are able to successfully integrate into the institution’s academic and social system are more likely to remain in college or persist (Tinto, 1975). As Tinto’s theory has evolved, learning communities were identified as one strategy to engage students in the institution system, both academically and socially (Tinto, 1997). In their studies Shapiro and Levine (1999) and Tinto, Love, and Russo (1993) have supported this notion and have found that students who participated in learning communities persisted at a higher rates than those students who did not enroll in a learning community.

Tinto (1975) examined student persistence through the lens of student dropouts. This seminal work warned practitioners of commonalities amongst students who are likely to dropout. Originally based on Durkheim’s (1951) analysis of social factors related to suicide and Spady’s (1971) original application to understanding student attrition, Tinto (1975) reframed a model that is still relevant today in examining student persistence.

Tinto (1987b) posited that the more a student is integrated into the college, the more likely a student is to persist and not withdraw from the institution. Prior to enrolling in the institution, students come to college with individual skills and various background characteristics that directly affect the student’s intentions for enrolling in college (Tinto, 1987a). The student background characteristics (i.e., age, gender, race/ethnicity, high school achievement,
socioeconomic status, etc.) and intent or goals (i.e., degree seeking) for enrolling in an institution in the first place are critical when considering students’ future departure or persistence decisions. Once enrolling into the college, the students’ integrations, both social and academic, become critical in influencing future persistence decisions (Tinto, 1987a).

Tinto (1993) updated his framework to the integration model. This model includes the significance of interactions within the classroom, as well as the interaction with faculty. Tinto (1993) stressed that these interactions could be significant for students in transition and on the student’s persistence. Once enrolling in college, academic integration happens when students connect with the intellectual life of the college. This is also related to the degree in which a student connects or adjusts to the academic culture of the college (Tinto, 1994). Social integration occurs when students develop or create relationships outside of the classroom. Social integrations can be related to relationships built with their peers, faculty or staff, as well as student involvement in cultural, athletics or recreational events (Tinto, 1993). Tinto stressed the importance of both the informal and formal interaction of academic and student systems to encourage student persistence (Karp, Hughes, & O’Gara, 2008). Once a student enrolls in the college, it is important for the institution to focus on the student persistence or retention (Tinto, 2003).

Tinto (1997) posited that these interactions could be enhanced by the implementation of learning communities. Tinto’s (1975, 1993, 1997) model highlights the characteristics (e.g., past academic performance, and personal background) incoming students possess, which should be identified and considered when looking at outcomes, such as the prediction of student persistence. Tinto’s model includes an emphasis on the first semester of college as a critical time for students to determine whether or not they will choose to leave. Learning communities have
been an intervention that aligned well with the intentional design of these communities that require students to integrate within the college (Huerta & Sperry, 2010) and to interact with their peer students (Chamberlain, 2011).

**Relationship with Study**

Tinto’s (1993) theoretical framework provided an excellent lens for this investigation, given the purpose of this study is to explore the relationship between student background characteristics and learning community students’ persistence. Student persistence is defined as continued enrollment to the subsequent semester (e.g., Fall-to-Spring, Fall-to-Fall). This theoretical model of student integration has been questioned for its appropriateness when studying community college student attrition. One reason is that the student experience at a community college may be different than that of a four-year residential experience (Tinto, 1993). However, since Tinto’s (1997) research suggested that learning communities may help with a student’s transition early in the college experience, this theoretical framework is appropriate. This framework is appropriate because all students in this study were enrolled in a learning community designed to encourage engagement or to increase integration, this study focused on the background characteristics of students upon initial enrollment in the college, and also included variables related to their college performance to determine their statistical significance to persistence. The student background characteristics considered in this study were demographic variables (e.g., age, gender, race and ethnicity, high school GPA, financial aid), and were theoretically significant in Tinto’s model.

Furthermore, Tinto’s (1975) model of student integration emphasized that beyond the characteristics students represent upon enrolling in college, the next key influences on a students’ choices to persist or depart are related to the academic and social interactions they experienced in
Learning communities align well with both academic and social integration given the intentional design of the learning communities. Students are enrolled in a first semester set of courses designed to increase the likelihood of interaction among students, their peers, and faculty throughout the full semester community experience. Also various activities such as group assignments, participation in team building activities, and the promotion of engagement in campus activities and recreation were generally infused within this curricular design for all participating students. Beyond the integration opportunities that occurred within the learning community, other indicators relating to the student integration were also tested in this study. The passing of required remedial and first-year experience coursework and college GPA were examined as college performance indicators representing the academic performance that may be related to a students’ decisions to persist in or depart from college.

**Definitions of Key Terms**

*Developmental education* is pre-college level coursework, and in this study, will mean pre-college coursework in math and/or English. Developmental coursework is required for students as determined by institutional placement tests and placement procedures. Developmental education is also commonly referred to as remedial education or remediation, and has been used interchangeably throughout this study.

*Student persistence* is defined as the situation in which students enroll in the subsequent Spring semester following their initial semester in college (i.e., Fall-to-Spring), as well as their continuation in college on to a third semester or one year later after initial enrollment (e.g., Fall-to-Fall).

*College performance indicators,* for the purpose of this study, are considered to be whether or not a student passed the following courses: developmental math, developmental
English, and a student success course. College GPA is also considered a college performance indicator.

*Learning community* is a community of three courses designed for first semester students in need of remediation in math, English, and an intensive student success course. Students who participate in the community are each enrolled in the same three classes with their peers. The intensive student success course is team-taught by the same faculty who teach the community math and English courses. A faculty counselor is also assigned to teach the student success course.
Chapter 2: Literature Review

As a result of the high percentage of community college students enrolled in remedial coursework, a need exists for faculty and community college administrators to better understand the student persistence dynamics related to this population. This study focused explicitly on the relationship between student background characteristics and college performance indicators and college student persistence in a developmental education learning community. The literature review in this chapter has been organized to align with Tinto’s (1993) model of student integration and departure. The first section will present an overview of current research on developmental education, including studies of college performance indicators (e.g., passing remedial coursework). The second section will review the literature on freshmen experience courses. The third section will present prior literature on learning communities. The fourth section will review studies of key student background characteristics for community college developmental education students and their direct association with student persistence. The final sections will review literature on the conditional effects of student background characteristics and college performance indicators on student persistence and will identify the gaps in prior literature.

Developmental Education

Determining college readiness. The issue of college readiness is especially relevant in the case of community colleges where the objective is to provide access to all prospective students interested in pursuing higher education. College readiness is generally defined as the level of preparation needed to enroll and succeed in credit-bearing college level courses without first taking remedial coursework (Conley, 2008). Adjusting to college can be difficult for many people, particularly for traditional aged individuals making the transition immediately after high
school graduation. For instance, college environments often providing greater independence for students compared to high school environments will require students to advocate for themselves (National Survey of Student Engagement, 2006).

College readiness is often most associated with the student’s academic skills in writing, reading comprehension, and/or mathematics, which are aligned with the courses that are most often associated with developmental education (e.g., developmental English and math courses) (Crews & Aragon, 2007). College readiness can also be associated with soft skills, such as a student’s level of maturity and lack of career or goal identity. Beyond the classroom, students who struggle to manage their time, lack study skills, and are uncertain of their career identity are also in need of developmental services (Conley, 2008). A report by ACT revealed that nearly 70% of graduating high school students were not ready for college-level work as indicated by their poor performance scores in reading, writing, and mathematics (Spence, 2009).

A student’s readiness to enroll in college-level work and the student’s high school achievements are two of the most important and consistent predictors of college student persistence (Bailey, 2009; Hagedorn, Maxwell, & Hampton, 2002; Mertes & Hoover, 2014). Institutional placement practices and procedures are used to identify if a student is ready for the level of developmental coursework needed (Hoyt & Sorensen, 2001). Although students may need developmental coursework, many institutional placement policies will allow them to enroll in other college level courses in addition to the required developmental courses (Kozeracki & Brooks, 2006).

Many institutions also use the results of college placement exams to properly assess student’s level of readiness in specific academic disciplines. Placement exams and practices are important in identifying areas where developmental coursework is needed and the appropriate
starting point (Hoyt & Sorensen, 2001). Students identified as not ready for college level work in math and/or English are often required to take a developmental education course or other courses dependent on need.

**Completion of required remediation.** Once a student is identified as not college ready in one or more areas, multiple levels of remediation can be required until college level proficiency is attained. Some researchers have defined academic success in college as the completion of academic programs by either degree or certificate (Attewell, Heil, & Reisel, 2011), while others have used indicators at the course level such as completion of a developmental course (Kozeracki, 2002). The literature has reported that the percentage of students who successfully complete their required remediation in math ranged between 50-60% (Attewell, Lavin, Domina, & Levey, 2006; Roksa, Jenkins, Jaggars, Zeidenberg, & Cho, 2009; Sullivan, 2010).

Students who require more than one level of remediation in a particular discipline, are less likely to complete their required remedial course sequence compared to students who only require one level of remediation (Roksa et al., 2009). In addition, students who fail to complete a remedial education course the first time they enroll in the course have been found less likely compared to those who do pass to ever complete their required remedial course sequence (Bahr, 2009, 2012). Overall, more than 50% of students in need of remedial coursework have needed one or more years to successfully complete their required remediation (Bailey, Jeong, & Cho, 2010). Roksa et al. (2009) examined the student records of first-time community college students from Virginia community colleges and found that the overall pass rate was 65% of developmental English and 48% of developmental math courses. Furthermore, approximately
50-60% of those referred to developmental education actually enrolled in the recommended course (Roksa et al., 2009).

Understanding enrollment or persistence dynamics based on specific required remedial coursework is important. For example, nearly 20% more students with needs for remediation who enrolled in a remedial course successfully completed their initial courses compared to students who did not enroll (Crews & Aragon, 2007). Boatman and Long (2010) however, have found that students who needed the most remediation in writing were more successful than those who needed less remediation in writing. The variability in these findings reinforces the need for further rigorous research.

The impact of needing remediation on student persistence was found to be significant for students who required multiple levels of remediation (Bailey, et. al., 2010). In an examination of the sequence of courses of students who required multiple levels of remediation, nearly half of those enrolled never completed their required sequence of remediation. Demographic characters like gender, age, and race/ethnicity were significantly correlated with the need for remediation (Bailey et. al., 2010).

**Developmental education and persistence.** A major area of concern for community college practitioners is the impact of needing developmental coursework on student persistence and on the graduation rates of participating students (Bailey, 2009). Attributing the persistence decision of a student to a singular factor is difficult because students drop out or take a break from their college progression for many reasons (Attewell et al., 2011). Fike and Fike (2008) found that around 50% of all community college students were not enrolled the year after initial enrollment. Less than 30% of community college students completed a degree or certificate (Roksa et al., 2009). Under-preparedness is an important indication that an entering student may
be at risk (Tinto, 1993). Under-prepared individuals enrolled in remediation courses can become frustrated and/or experience little satisfaction when they know that the courses do not earn credits towards a degree.

When using the definition of student persistence as continued enrollment in college to the subsequent semester, many researchers have found that developmental students persisted at a higher level than those who did not require remediation at all (Bahr, 2007; Calcagno, Crosta, Bailey, & Jenkins, 2007; Fike & Fike, 2008). In addition, students who successfully complete their developmental coursework do not persist and complete their degrees at the same rate as students who do not need remedial education in the first place (Bailey, 2009). Students in need of significant remediation tended to have worse outcomes toward course and degree completion (Bremer et al., 2013).

James, Morrow and Perry (2002) explored retention and persistence rates of students for six years. One important finding in their study was that students who required less remediation were more successful in persisting in college and completing college level coursework. Others have found no difference in persistence rates between remedial and non-remedial students (Roksa et al., 2009). However, students who require remediation graduate at lower rates compared to those who are college ready and do not require remediation in college (Bailey, 2009).

When looking at the relationship with predicting persistence by discipline for students enrolled in developmental courses, Fike and Fike (2008) found the strongest predictor of persistence was passing a developmental reading course. Enrolling in a required developmental math course improves the likelihood of persistence compared to those who chose not to enroll in the remedial mathematics course (Fike & Fike, 2008). In a study of both two-and-four-year
institutions, Boylan, Bliss, and Bonham (1994, 1997) evaluated a sample of students enrolled in developmental education programs to measure the relationship between the courses a student enrolled in and first semester retention. The results for community college students were that students in remedial mathematics courses were retained at a higher level when placement was mandatory in remediation compared to when placement was not mandatory. The second finding was that retention rates were higher when students in remedial courses were also provided supportive counseling.

**Freshman Experience Courses**

One common subset of a learning community can be tied to a first-year or freshman experience program or course (Soldner, Lee, & Duby, 1999). Institutions have developed and offered freshman seminar courses as an intervention strategy to support student transitions into college and to help them understand the expectations of the college (Boylan, 2009). Early opportunities for engagement and structured activities for new students are important for improving college success outcomes (e.g., successful course completion, persistence) (McClenney, 2007).

The creation and implementation of first-year experience programs have increased over time in higher education, and although there is significant variation of these courses, first–year experience programs have been found to have a positive effect on student persistence (Cuseo, 1997). Contributing to the relationship to persistence, first-year experience courses are also key concepts related to Tinto’s (1993, 1997) model of student departure, specifically relating to the positive impact on academic and social integration. The large number of developmental students who drop out early in their developmental sequence suggests that the offering of a learning community or student success course is needed (Bailey et al., 2010).
The life skills developed by students who enroll in a first-year experience course can positively influence lifelong learning and support the promotion of student success (Cuseo, 1997). The opportunity for skill development is particularly true if related topics covered in the course are aligned with student development efforts (i.e., goal setting, motivation, time management, stress management, etc.). In addition, another important finding from Cuseo’s (1997) research is the positive influence first-year experience courses can have a student’s sense of belonging. When considering Tinto’s (1993) theoretical framework, the feeling of belonging to a college community can have a positive effect on a student’s decision for continual persistence. Another important characteristic identified as important for the creation and teaching of successful first-year experience courses is the alignment of academic and student affairs (Sidle & McReynolds, 2009). The commitment and alignment of the courses with support services during the critical first semester will demonstrate to students the commitment the college has in supporting student success and persistence.

Student success courses can increase the likelihood of second year persistence, as well as of credit attainment (Cho & Karp, 2013). These results are similar to the findings of Zeidenberg, Jenkins, and Calcagno (2007), who tracked student cohorts of students who attended community colleges in Florida. Zeidenberg et al. (2007) compared students who enrolled in a student success course with a group who did not enroll in the course. Students who initially enrolled in the student success course completed more credits, persisted at a higher level and transferred to a four year college at a higher rate compared to those students who did not enroll in the course.

**Learning Communities**

The use of learning communities has steadily increased over the last twenty years in higher education (Love, 2012). The main goals of using this instructional design are to improve
student learning, to enhance the student experience, and to integrate various disciplines within one learning experience to improve student retention and completion (Love, 2012). Learning communities can be defined in many ways, and can have various characteristics, such as acceleration, team learning, a residential component, and several other possibilities. Soldner et al. (1999) described learning communities as communities where faculty and students work together towards a common purpose in more than one course.

Students who participate in learning communities persisted at higher rates than students who did not enroll in a learning community (Shapiro & Levine, 1999; Tinto et al., 1993). Research at the university level found that students who participated in a learning community designed for first semester students were more likely to persist beyond the first semester compared to students who did not participate in the freshman learning community (Tinto & Goodsell, 1993). One of the goals for learning communities is to increase the engagement of students, not only with the academics, but also socially with other students and with faculty.

**Academic and Social Integration.** Social integration has been found to have a positive effect on student persistence (Attewell et al., 2011; Cohen & Brawer, 2008; Tinto, 1997). Social integration has also been found to have a significant effect on the likelihood of passing a developmental course (Dubray, 2005). Students who are able to pass their required remedial coursework are more likely to persist in college (Fike & Fike, 2008). Student-centered pedagogy can help students integrate socially and assist with their levels of social engagement with peers (Tinto, 1997).

Student involvement or integration into college life has been found to increase the likelihood of student persistence (Astin, 1984; Mallette & Cabrera, 1991; Nora, 1987; Pascarella & Terenzini, 1980; Terenzini & Pascarella, 1977). The opportunities learning communities
create for social interactions may allow for a coherence among the students and to reinforce a sense of purpose across the community (Kellogg, 1999). Students who participate in a learning community can improve intellectually and socially compared to peers who do not participate in a learning community (Shapiro & Levine, 1999). Interactions that occur within the classroom while students participate in a learning community can also extend outside of the classroom into other parts of the college experience (Tinto & Russo, 1994). Tinto and Russo (1994) found that students were more engaged in various activities and became more actively involved in their learning when participating in a learning community.

Zhao and Kuh (2004) examined the relationship between learning communities and student engagement. They found that participation in learning communities improved academic performance and demonstrated the integration of both the academic and student experience of student participants. Although their study was conducted looking at both freshman and senior students at a university, their findings are significant when considering the longitudinal impact of exposing students to activities, such as how interactions with peers and faculty can have an influence on their likelihood to continue similar engagements later on in their college experience (Zhao & Kuh, 2004). They also found that the results of learning communities were stronger on first-year students compared to students who had been enrolled in college for a number of years.

Beyond interactions with others students, engagement with faculty has also been found to be important when considering student development and integration (Astin, 1993). Several studies have linked learning communities to being well suited to improve critical thinking and communication abilities of students (Inkelas & Weisman, 2003; Pastors, 2006; Saltiel & Russo, 2001). Participation in a learning community can result in better academic performance (Brittenham et al., 2003; Knight, 2003; Raftery, 2005), including students’ achieving higher
GPAs (Tinto, 1997). To extend his research, Tinto (1997) conducted a study examining learning communities and community college persistence and learning. The intent of this study was to build upon earlier research and focus on student involvement in the classroom as it relates to student learning and to student persistence. The conclusion of Tinto’s (1997) study led to a modification of a theoretical model related to student persistence. Based on the evidence, learning communities can have a profound impact on the integration of students within the college environment and affect student persistence and longitudinal success.

**Learning communities for underprepared students.** Most studies examining the effect of learning communities specifically focused on underprepared students have been done at four-year institutions (Barbatis, 2010). Although the designs of the learning communities vary greatly, the results of learning communities designed for students enrolled in remedial classes have been positive (Boylan, 1999; Burley et al., 2001; McCabe, 2003; Roueche & Roueche, 1999). For the most part, learning communities have led to higher persistence and completion rates for students who participate (Boylan, 1999; Roueche & Roueche, 1999).

Recently, a comprehensive study, called the Learning Communities Demonstration, was conducted to examine the effects of learning communities on community college student success and persistence (Weisman et al., 2012). This study was a large scale evaluation of learning communities, focusing on community colleges. The six community colleges from Maryland, Florida, Texas, New York and California participated in the study (Weisman et al., 2012). Each college had approximately 1,000 volunteer, student participants. The learning community designs in these studies varied; however, most models included the linkage of two courses, often including one developmental course with another college level course.
Fairly consistent results were found from studies examining learning communities at Houston Community College and Queensborough Community College. Weissman et al. (2011) found students who require remediation and participate in the learning community are more likely than non-participants to successfully complete their required remedial coursework. At Houston, students who participated in the learning community were more likely to pass their assigned developmental math course during the learning community semester than non-participants who required similar developmental math coursework. Although researchers found that learning community students were more likely to persist compared to the control group of students who did not participate in the community, participation in the community had no impact on cumulative credits (Weissman et al., 2011).

At Queensborough Community College, the learning community design linked the required developmental math course with either a developmental or college level English course (Weissman et al., 2011). A secondary learning community design linked the required developmental math course with a variety of other college level courses (i.e., business, speech, etc.). Similarly to the study at Houston Community College, students who enrolled in the learning community were more likely to pass the developmental math course during the program semester compared to students who did not participate in the learning community. Students participating in the learning community at Queensborough were also more likely to not only enroll in the second math course during the subsequent semester, they were also more likely to pass the second math course. Student in this program were also more likely to earn more credits than non-participants, but were no more likely to persist in college than their non-participating peers (Weissman et al. 2011).
Additionally, participating students at Queensborough were also more likely to complete the required English course in the subsequent semester (Weisman et al., 2012). In the same study, a learning community examined at a different institution found that students who did enroll in the learning community earned significantly more developmental English credits than those who did not enroll (Weisman et al., 2012). However, one interesting finding was that only half of the students who were assigned to enroll in the learning community actually did enroll in the community (Weisman et al., 2012).

The results were different at the Community College of Baltimore County (CBCC) (Weisman et al., 2012). The learning community design at CBCC included a developmental English course as the required course in the learning community design, along with a credit-bearing course in another discipline (i.e., health, psychology, speech, etc.) (Weisman et al., 2012). Findings from this study were that students attempted and passed developmental English courses at the same rate as those who did not participate in the community. No significant difference was found in either the total credits earned or the likelihood of student registration in the subsequent semester after participating in the learning community (Weisman et al., 2012). This comprehensive study added to the research related to the effect learning communities can have on community college students.

**Student Background Characteristics and Persistence**

Student background characteristics have been empirically linked to student persistence (Bailey et al., 2010; Cohen & Brawer, 2008; Jepsen, 2006; Roksa et al., 2009; Sullivan, 2010; Wolfle & Williams, 2014), and are important to understanding the effect background characteristics have on how students integrate into the college environment (Tinto, 1987a). Student background characteristics are theoretically relevant to student persistence in Tinto’s
models (Tinto, 1975, 1993). Researchers found that students who require remediation are systemically different in terms of student background characteristics (i.e., gender, ethnicity, first-generation status, academic preparation, etc.) than those students not requiring remediation (Crisp & Delgado, 2014).

**Academic performance.** Poor academic performance in high school is the most commonly associated characteristic of students who require remediation (Attewell et al., 2006; Bailey et al., 2010). The numbers of students who require remediation immediately out of high school has continued to increase over time (Kozeracki & Brooks, 2006). Aside from being deemed not ready for college level work by the results of college placement exams, students identified as needing required remediation tended to have lower high school grades (Boatman & Long, 2010).

The academic performance of a student both in high school and after enrolling in college are two of the most consistent indicators of likelihood of student persistence. Prior research consistently showed that past academic achievements (e.g., high school grade point average, college admission exam scores) (Hirschy, Bremer, & Castellano, 2011) have a direct effect on student persistence. Beyond persistence, the lack of preparation or readiness for college will affect students’ not achieving their original goals and their likelihood of graduation from college (Bailey et al., 2010; Wolfle & Williams, 2014). In another study, Yates (2010) found one of the best predictors of success in college is high school performance.

Once a student enrolls in college, recent researchers have suggested that academic performance in college is one of the strongest predictors for student persistence, even beyond the consideration of assessing the abilities of a student upon initial enrollment (Campbell & Blakey, 1996; Makuakane-Drechsel & Hagedorn, 2000; Nakajima, Dembo, & Mossler, 2012; Porchea,
Allen, Robbins, & Phelps, 2010). Pascarella and Terenzini (2005) found that college grades are the single best predictor of student persistence. Students who had under a 2.0 GPA after the first semester in college had only a 57% chance of persisting to the second year. Conversely, students who earned over a 3.3 GPA had over a 91% chance of persistence.

When looking at the academic performance of students who require remediation in college, Kolajo (2004) conducted a comparison study at Cecil Community College of students needing developmental education coursework and a group of students who did not need remediation who eventually graduated. In this quantitative study, 61% of the graduates had to take one or more developmental education courses (Kolajo, 2004). The graduation GPAs of those who took one developmental course were similar to the GPAs of students who did not need any developmental coursework; however, students needing one developmental course took two semesters longer on average to complete their degrees (Kolajo, 2004). This study included both part-time and full-time students.

**Student demographic characteristics.** In contrast to a student’s academic performance, student demographic characteristics have, in general, less consistent findings related to their direct effects on student persistence. However, as the demographics of students enrolling in higher education, particularly in open access community colleges, are evolving, current research is critical to understanding student demographic effects on persistence. The following demographic characteristics are examined in this section: age, gender, race and ethnicity, socioeconomic status, and financial aid.

**Age.** Students attending community colleges are typically older than those enrolling in four year colleges or universities (Cohen & Brawer, 2008). Although the definitions of traditional aged and non-traditional aged students vary, most commonly non-traditional aged or
adult learners are defined as those who are 25 or older (Roksa et al., 2009). The age range of students who require remediation varies from traditional aged high school students who have areas of deficiencies that need to be addressed, to older, non-traditional aged students who may need to address deficiencies or simply refresh skills that they may not have used for some time (Tinto, 1993). Depending on the type of required remediation, age may impact those who are most likely to require remediation (Bailey et al., 2005). For example, younger students may be more likely to be required to take remedial English than older students, while older students may be slightly over-represented in remedial math courses (Bailey et al., 2005). When considering successful course completion or progress towards graduation, researchers have also found that a key barrier for older students was completing the developmental math course. Non-traditional aged students generally have more life circumstances to balance, which results in the length of time to their completion of degree requirements being longer (Pan, Guo, Alikonis & Bai, 2008).

According to Chaves (2006), more research is needed to adequately study community college student persistence, particularly in non-traditionally aged students, although findings related to whether or not age has an effect on who is more likely to require remedial coursework have been inconsistent. More clarity exists when considering age as it affects the likelihood of success in remediation. The majority of researchers have found that non-traditional aged students are more likely to be successful in completing required remedial coursework (Calcagano et al., 2007; Cho, 2011; Fike & Fike, 2007; Roksa et al., 2009).

The relationship between the age of a student who requires remediation and persistence has been inconsistent (Calcagno et al., 2007; Fike & Fike, 2008; Jepsen, 2006). Many studies have reported community college non-traditional aged students have persisted at lower rates than younger students (Fike & Fike, 2008; Hagedorn et al., 2002; Windham, 1995). In addition, adult
learners have also persisted at lower rates in required remedial sequencing (Bailey et al., 2010). In contrast, a number of other studies have found that older students persist or graduate in college at a higher rate than traditional aged students (Alvarez, 2008; Bremer et al., 2013; California Community Colleges Chancellor’s Office, 2011; Jepson, 2006; Kolajo, 2004; Porchea et al, 2010; Wolfle & Williams, 2014). In addition, Calcagno et al. (2007) found that older students who required remediation were more likely to graduate compared to traditional aged college students who required remediation.

**Gender.** More women are enrolling in community colleges than men, with nearly 60% of the student population being female (Bailey, Calcagano, Jenkins, Kienzl, & Leinback, 2005; Cohen & Brawer, 2008). In fact, more women than men are enrolling in higher education in general across the United States. In relation to course success, those females who required remediation tended to be more successful in completing their required remediation compared to males who require remediation (Fike & Fike, 2007; Roksa et al., 2009). Male community college students tended to have graduated faster than female students on average, and female graduates were slightly older than male graduates (Kolajo, 2004).

Similarly to age, gender also has inconsistent results when considering the relationship between gender and student persistence (Cho, 2011; Porchea et al., 2010; Roksa et al., 2009). Many researchers have found that women were more likely than men to persist in college (Peltier et al., 1999; Porchea et al., 2010). When examining resistance beyond one subsequent term after initial enrollment, Mattern and Patterson (2009) found that females persisted to their second year of study at a similar rate compared to male students. This leveling off over time may be related to findings in other studies, such as those of researchers who found that gender did not have a significant effect on determining the likelihood of persistence (Fike & Fike, 2008; Wolfle &
Williams, 2014). Research focusing on gender and its direct relationship with student persistence, specifically focusing on community college students who required remediation, has been less prevalent than research on other demographic background characteristics. The lack of research results in the need for additional research exploring the association gender has with college student persistence.

**Race and ethnicity.** Unlike with age or gender, researchers have found a more consistent direct effect of race and ethnicity on student persistence (Bailey et al., 2010; Roksa et al., 2009; Sullivan, 2010; Wolfe & Williams, 2014). Nearly one third of students enrolled in community colleges are non-white, a higher percentage compared to the number of non-white students enrolled in four year colleges or universities (Cohen & Brawer, 2008). A high percentage of all students enrolling in community colleges required some level of remediation, however, Black students were more likely to enroll in developmental coursework than white students (Attewell et al., 2006). One recent study examining over 100 community colleges found that over half of the students identified as needing remediation were Black or Hispanic (Cho, 2011).

Looking beyond the relationship between race and ethnicity and the requirement of needing remediation to the academic performance of other diverse groups who require remediation is important. White students have been found to be more likely to complete their developmental courses than students of other ethnicities (Bettinger & Long, 2005; Fike & Fike, 2007). Black students have been found to have much lower success rates in remedial coursework (Bailey et al., 2010; Roksa et al., 2009). In other studies researchers found race or ethnicity to not be significant when looking at course success (Gonzales, 2007).

The persistence of community college students based on race and ethnicity who require remediation has also been found to be an important factor to be considered. Non-white students
have been found by many researchers to persist at a lower rate compared to white students (Bailey et al., 2010). Bremer et al. (2013) also found that white and Asian-American students were more likely to persist compared to students representing other racial groups (Kao & Thompson, 2003). However, not every study has found race or ethnicity to be significant when examining the predictors of first-year student retention of community college students (Fike & Fike, 2008).

Financial aid. A students’ socio-economic status in relation to their abilities to fund the cost of enrolling in college is also an important student background characteristic for consideration. Student finances have been found to have a contributing factor on students’ persistence (Attewell et al., 2011; Cohen & Brawer, 2008). The receipt of financial aid has been found to have an effect on student persistence (Fike & Fike, 2008; Wessel, Bell, McPherson, Costello, & Jones, 2006). Fike and Fike (2008) found that financial aid was a predictor of student persistence. Researchers have found that the receipt of financial aid in the form of grants has a positive association with community college student persistence (Bettinger, 2004; Mendoza, Mendez, & Malcolm, 2009). However, one concern has been that nearly 45% of community college students who would have been eligible for grant funding did not even complete the Free Application for Federal Student Aid (FAFSA) to be considered for financial aid, putting these students at risk for attrition. Zhai and Monzon (2001) found that financial difficulties for community college students can significantly affect persistence decisions.

McKinney and Novak (2013) investigated the relationship between filling out the FAFSA form and community college students’ persistence. McKinney and Novak (2013) found that students who did not file the FAFSA form were negatively affected and less likely to persist. Not filing the FAFSA form made those students ineligible for federal grants, work study, and
loan programs to help them afford their college bills (McKinney & Novak, 2013). Long (2010) concluded that although more research is needed related to what different financial aid opportunities (i.e., work study, loans, grants) are most effective for community college students’ persistence, providing aid in general has a positive relationship with the likelihood of student persistence.

**Conditional Effects on Student Persistence**

Given the varied and inconsistent results of many of the selected college performance indicators and student background characteristics identified above, one may conclude that attributing student attrition or persistence to one variable can be difficult. Few studies have considered the moderating or conditional effect of these variables on student persistence.

Research conducted on students’ persistence at four year institutions has found interactions of multiple variables to have a moderating effect on initial direct effect findings (Murtaugh, Burns, & Schuster, 1999; St. John, Hu, Simmons, & Musoba, 2001). For example, one researcher reported that gender effects dissipated when additional variables were introduced into the analysis when examining student persistence (Murtaugh et al., 1999). Similar to gender, prior literature suggested the race effects may also be conditioned by other student characteristics, such as academic performance (Reason, 2001). When considering the conditional effect of race with other student characteristics, Murtaugh et al. (1999) found the impact of race on predicting student persistence was moderated when further analysis showed that student’s college major, high school GPA, and college GPA conditioned the influence of student race/ethnicity on retention. Additionally, Wlodkowski et al. (2002) found that financial aid has a positive effect on older student persistence. The most consistent effect was academic performance (Murtaugh et al., 1999).
The examination of interactive relationships with multiple variables is also sparse looking at community college demographics and student persistence. In a recent study, Wolfle (2012) looked at the effect of age and race or ethnicity as it related to a student’s developmental mathematics status and second year retention. Wolfle (2012) found that non-traditional aged students and white students were most likely to succeed in their developmental courses. Wolfle also found that students who required remediation in math and those who did not persisted at statistically similar rates.

Wolfle’s (2012) interactive study only focused on age and race/ethnicity as they related to second year retention and did not consider additional demographic variables to further explore the interactive effect of those additional variables. In another study examining community college students’ persistence, Wolfle and Williams (2013) found that race/ethnicity or gender did not significantly impact the likelihood of students’ persistence. Additionally, recent researchers have found that higher GPAs early in a college moderate the effects of student background characteristics significantly (Nakajima et al., 2012; Porchea et al., 2010). This example of moderation demonstrates the value interactive research provides for an improved understanding of what impacts or predicts student persistence the most.

Gap in Literature

Students’ persistence has been investigated extensively and has provided a foundation for community college practitioners to reference when developing institutional programming and student success strategies. Given the findings related to learning communities and their positive effect on community college students’ persistence in multiple instances (Weisman et al., 2011, 2012), no previous research has included a learning community designed specifically to include a remedial math course, a remedial English course and a student success course at one time. In
addition, most researchers examined the effects learning communities have had on students’
persistence in comparative studies (Weisman et. al., 2011, 2012).

In addition, this literature review presented several studies and key findings related to
pre-college student attributes and characteristics, as well as post-enrollment academic and social
interactions relating to developmental education student persistence. Wolfle and Williams
(2014) concluded that the cause for student attrition or non-persistence is difficult to attribute to
a single factor. The findings presented by researchers were inconsistent findings related to the
direct associations of student background characteristics on the likelihood of students’
persistence. The strongest predictors for persistence have been past academic achievement and
readiness, as well as the initial academic performance of students while enrolled in community
college. The receipt of financial aid has also been found to have a positive correlation with
student persistence (Fike & Fike, 2008). Much of the research examining effects of student
background characteristics have been focused solely on the direct effects or association of single
variables on and with persistence. In addition, Wolfle and Williams (2014) cited the lack of
literature and empirical evidence using interactive variables to explore the moderating effects of
those variables when predicting students’ persistence for those students requiring remediation.
Given that most past research on learning communities has primarily focused on the effects
participating in a learning community has had on students’ persistence, research is needed to
look more at the students within the learning community. Looking at the relationships between
multiple variables representing student background characteristics and college performance
indicators of participants in a learning community may provide even more information on how
variables or indicators relate to the likelihood of persistence.
Chapter 3: Research Design and Methodology

This study built upon prior literature to advance the understanding of the relationship among students’ background characteristics and college performance indicators with the persistence of students who participated in a learning community. This chapter provides a description of the research design and methodology of this study in the following sections: research questions, research hypotheses, research design, data analysis, validity, reliability, generalizability, and protection of human subjects.

Research Questions

This study examined both the direct and interactive associations of students’ background characteristics and college performance indicators on the persistence of students who enrolled in a developmental education learning community. The following research questions guided the study:

1. Is there a relationship among students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) with the persistence of students enrolled in a learning community?

2. How do interactions between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) relate to the persistence of learning community students?
Several selected and theoretically relevant independent variables were tested representing students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., student goal, GPA, remedial course grades, student success course grades). Students self-selected into the learning community, and the community took place during the students’ first semester in college. Two dependent variables were used for both research questions. The first dependent variable was student persistence into subsequent semester after initial enrollment in college (e.g., Fall-to-Spring). The second dependent variable was student persistence to the third semester in college or one year later from initial enrollment (e.g., Fall-to-Fall).

Research Hypotheses. Hypotheses for each research question were developed to test the relationship between the students’ background characteristics and college performance indicators with learning community students’ persistence.

1. Is there a relationship between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) with the persistence of students enrolled in a learning community?

Given the number of selected and theoretically relevant independent variables to be tested for the correlation between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA 76 and above, received financial aid) and college performance indicators (e.g., college GPA 2.0 and above, pass developmental math course, pass developmental English course, pass student success course) may have had with learning community student persistence, the following null and alternative hypotheses are offered:
H₀₁: There is no significant relationship between students’ age and developmental learning community students’ persistence.

H₁₁: There is a significant relationship between students’ age and developmental learning community students’ persistence.

H₀₂: There is no significant relationship between students’ race/ethnicity and developmental learning community students’ persistence.

H₁₂: There is a significant relationship between students’ race/ethnicity and developmental learning community students’ persistence.

H₀₃: There is no significant relationship between students’ gender and developmental learning community students’ persistence.

H₁₃: There is a significant relationship between students’ gender and developmental learning community students’ persistence.

H₀₄: There is a significant relationship between students’ high school GPA and developmental learning community students’ persistence.

H₁₄: There is a significant relationship between students’ high school GPA and developmental learning community students’ persistence.

H₀₅: There is no significant relationship between students’ receipt of financial aid and developmental learning community students’ persistence.

H₁₅: There is a significant relationship between students’ receipt of financial aid and developmental learning community students’ persistence.

H₀₆: There is no significant relationship between students’ college GPA and developmental learning community students’ persistence.
H₁₆: There is a significant relationship between students’ college GPA and developmental learning community students’ persistence.

H₀₇: There is no significant relationship between students’ passing developmental math course and developmental learning community students’ persistence.

H₁₇: There is a significant relationship between students’ passing developmental math course and developmental learning community students’ persistence.

H₀₈: There is no significant relationship between students’ passing developmental English course and developmental learning community students’ persistence.

H₁₈: There is a significant relationship between students’ passing developmental English course and developmental learning community students’ persistence.

H₀₉: There is no significant relationship between students’ passing the student success course and developmental learning community students’ persistence.

H₁₉: There is a significant relationship between students’ passing the student success course and developmental learning community students’ persistence.

2. How do interactions between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) relate to the persistence of learning community students?

This question allows for the investigation of the interactive relationship of selected variables when combined as one independent variable in doing a multivariate analysis. Also included in the model were all of the direct association variables used to test research question
one representing students’ background characteristics and college performance indicators. When considering the interactive variables, the following null hypotheses are offered:

\( H_{010} \): There is no significant relationship between students who pass remedial math course and the student success course, with student persistence.

\( H_{110} \): There is a significant relationship between students who pass remedial math course and the student success course, with student persistence.

\( H_{011} \): There is no significant relationship between the gender of students who pass the math course, with student persistence.

\( H_{111} \): There is a significant relationship between the gender of students who pass the math course, with student persistence.

\( H_{012} \): There is no significant relationship between the gender of students who pass the student success course, with student persistence.

\( H_{112} \): There is a significant relationship between the gender of students who pass the student success course, with student persistence.

\( H_{013} \): There is no significant relationship between non-traditional age students and those who pass the student success course, with student persistence.

\( H_{113} \): There is a significant relationship between non-traditional age students and those who pass the student success course, with student persistence.

\( H_{014} \): There is no significant relationship between students with high school GPA 76 and above, and college GPA, with the likelihood of persistence.

\( H_{114} \): There is a significant relationship between students with high school GPA 76 and above, and college GPA, with the likelihood of persistence.
H₀15: There is no significant relationship between non-traditional age students and male students, with student persistence.

H₁15: There is a significant relationship between non-traditional age students and male students, with student persistence.

H₀16: There is no significant relationship between students with a high school GPA of 2.0 and above, and receipt of financial aid, with student persistence.

H₁16: There is a significant relationship between students with a high school GPA of 2.0 and above, and receipt of financial aid, with student persistence.

**Research Design**

This study used a quantitative correlational design for the purpose of identifying the predictive relationship between students’ background characteristics and college performance indicators on developmental education learning community students’ persistence. Quantitative research designs are viable to exploration of the relationships between variables (Creswell, 2009). Correlational research should be conducted when the purpose of the research is to help explain the prediction of likely outcomes (Frankel, Wallen, & Hyun, 2012). Prediction studies look to identify the levels of relationships between multiple variables. When a relationship between multiple variables is sufficient, it can become possible to predict an outcome (Frankel et al., 2012).

Although a quasi-experimental design would allow for a comparison of students who did not enroll in the learning community to be included and use the learning community sample as the control group, it is this researcher’s understanding that the identification of the non-participants would have been difficult as they were not formally tracked by the research site. The primary disadvantage to this design is the lack of a comparative group to test against the sample
studied in this design. However, this specific study was focusing within the learning community environment and examining the association between multiple variables of students who did participate in a learning community to identify the significance of each variable when considering the predictability of persistence; therefore, this design was best suited to extend the literature and was appropriate.

The advantages for using the design outweighed any of the identified disadvantages. The methodology allowed for possible identification of predictor variables for learning community student persistence. A strength exists in the alignment of Tinto’s (1993) theoretical framework for student integration with the methodology, as the design includes variables representing student background characteristics and college performance indicators (i.e., academic and social integration) and the interactive association of variables that impacted students’ choices to persist.

Research site. This research was conducted using data from a public, rural, open access community college located in the northeastern United States. This site was chosen because of its established learning community program designed for students in need of remediation and because of convenience.

In Fall 2014, the institution enrolled over 4,200 students. Nearly 90 percent of the student body was from a geographic location of within 50 miles of the institution’s main campus. Over 70 percent of first-time students indicated that their educational goal was to earn an associate’s degree. Approximately 60 percent of the students were enrolled in either an Associates of Arts (AA) or an Associates of Science (AS) degree designed for transfer to a baccalaureate granting institution upon graduation, with the rest of the matriculated students enrolled in either an Associates of Applied Science (AAS) or Certificate program. In the 2013-
2014 academic year, the institution had 24 degree programs representing AA, AS, AAS or certificate programs.

Concerning student demographics and other background characteristics, over 60 percent of the enrolled students were full-time, which required enrollment in at least twelve (12) credit hours per semester. The most recent college profile showed 60 percent of the students were female, and more than 70% of the students were 24 years old or younger. The mean age for all students was 23 years old. Nearly 90 percent of the students identified themselves as white, 2.5 percent as Black, and 2.7 percent as Hispanic. Asian, Native American, Native Hawaiian/Pacific Islander, multi-racial and unknown made up less than 1 percent each of the remaining student population.

Sample. A purposive sample was used for this study. A purposive sample is a selection of participants based on desired characteristics or status (Fraenkel et al., 2012). The sample selected for this study was restricted to first-time, full-time students who enrolled between the Fall 2007 semester and the Spring 2014 semester in a first semester learning community. Because this study looked at student persistence up to one year after initial enrollment, the cohort who enrolled in the learning community during Spring 2014 was the last year of complete available data examined. Students self-selected to participate in the community during their first semester in college. The sample size was 424 students who enrolled in the learning communities during the selected period in time.

The learning community assessed was offered to students who, upon matriculation, had been identified by both their results from initial college placement exams (the participating institution uses Accuplacer) and the institution’s general placement guidelines. Students who were eligible for this program were presented with the opportunity to join the learning
community during an initial intake advisement and registration appointment. The community was typically composed of 15 students and 3 faculty members. The community itself included three specific courses: (a) developmental English, (b) developmental math, and (c) the student success course. Student participants must have enrolled in each of the courses listed above, and only those students comprised a particular community. The faculty assigned to the developmental English and developmental math courses were also assigned to team-teach the intensive student success course, along with a college counselor. The team-taught intensive student success course was an extension of the basic first-year experience requirement of the institution, and was designed to also include various activities related to social and academic integration (i.e., team building, project development, communication, etc.).

Data collection instruments. Data representing learning community participants’ information between Fall 2007 and Spring 2014 were collected from the participating research site to examine the research questions. The data were pre-existing and were stored at the research site in its database management system. The college used Banner as its database management system, which stored students’ academic records and background/demographic information. The information was entered into Banner by either being uploaded directly from the students’ admissions applications (e.g., student demographic information) or by college staff (e.g., course grades). The archived data provided detailed information on student background characteristics (i.e., age, race/ethnicity, gender, high-school GPA, etc.), and indicators related to the students’ community college performance (i.e., developmental course grades, GPA, re-enrollment in college, etc.).

All of the provided data had been internally reviewed as the institution was required to report student information, including demographic information, as part of their official records.
and annual reports. This review process required the institution to verify entered information as well as to collect any required missing student data that should have been captured by the students’ admissions application or by college staff prior to this review taking place. This secondary review process of the data ensured the validity of the data.

**Data collection procedures.** The retrieval of data began with a request for information detailing the required students’ background characteristics and college performance indicators for those students who participated in the learning communities between the Fall 2007 and Spring 2014 semesters. The participating institution’s Director of Institutional Research received the request and retrieved the requested data. A pre-existing report within the college’s IR office contained the information needed to conduct this study. The information had not been used for rigorous examination of any kind. Prior to the acquisition of the data, personally identifiable information pertaining to the students included in the sample was removed by the research site. The college’s Institutional Research (IR) department had access to the data and provided the data set in an Excel spreadsheet. The data were stored on a secured and password protected external hard drive.

**Data Analysis**

**Preparation and transformation.** Once data were received, analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 23. In order to prepare the data once obtained, and before conducting the correlational analysis using logistic regression techniques, the independent and dependent variable data were transformed or recoded to conform to be dichotomous, based on variable definition. In addition, descriptive statistics including the means, standard deviations, and percentages were calculated for the sample.
Independent variables. The independent variables included in the study represented students’ background characteristics and college performance indicators. The following table illustrates the independent variables examined in this study:

Table 3.1

<table>
<thead>
<tr>
<th>Independent Variable Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Non-White</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
</tr>
<tr>
<td>Not Received Financial Aid</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
</tr>
<tr>
<td>Pass Remedial Math Course</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
</tr>
<tr>
<td>HS GPA 76 and Above</td>
</tr>
<tr>
<td>College GPA 2.0 and Above</td>
</tr>
</tbody>
</table>

Dependent variables. For each of the research questions two dependent variables were used to measure students’ persistence. The same dependent variables were applied to each of the questions as two distinct persistence indicators. The first dependent variable represented the subsequent semester after initial enrollment and the second dependent variable was persistence in college one year later. The first dependent variable was a binary outcome that captured whether learning community students enrolled in the subsequent Spring semester (i.e., Fall-to-Spring) (1 = Yes, 0 = No). The second dependent variable was a binary outcome that captured if learning community students continued enrollment in college one year later (i.e., Fall-to-Fall) (1 = Yes, 0 = No).

Power analysis. An alpha level of .05 was used to determine whether the findings were statistically significant (Slavin, 2007). The use of this alpha level reduced the chance of creating a Type I error to a 5% chance. A Type I error occurs when a null hypothesis is rejected even
though it is true (Field, 2013). A Type II error is the acceptance of a null hypothesis when it is false (Field, 2013).

Analytic strategy. In order to address the two research questions, binary logistic regression was used to assess students’ background characteristics and college performance indicators as predictors of college students’ persistence. This study also examined the influence of interactive associations of both the selected students’ background characteristics and college performance indicators in relation to students’ persistence. Given the correlational design, logistic regression techniques were used to determine the relationships among variables (Pampel, 2000). Logistic regression also calculates the odds ratio to determine the probability of something to occur or not (i.e., persist or not persist) (Pampel, 2000). This strategy was chosen given both the categorical dichotomous nature of the dependent variable used in this study of students’ persistence, as well as because the purpose of this study was to examine the impact of multiple independent variables as predictors of students’ persistence. Logistic regression was also appropriate given the sample size. When a sample includes a minimum of 50 cases, logistic regression can be used (Grimm & Yarnold, 1995). Discriminant analysis was not chosen as an analytic strategy because the independent variables in this study were both categorical and continuous, making logistic regression essential to complete the analysis (Tabachnick & Fidell, 1996).

The first step in the analysis was to conduct the assumption checking to ensure each assumption was met. By design, given the dichotomous nature of the dependent variable, no assumption existed of a linear relationship between the dependent variable (e.g., student persistence) and any of the independent variables. A casewise list was produced to examine the sample to ensure that each case within the sample fit the model. No outliers that had to be
addressed were identified and no cases had to be removed from the sample. Given the racial and ethnic demographics of the research site in this study, one issue that needed to be addressed because there were not sufficient cases representing different racial or ethnic groups. As a result, a dichotomous variable was created: white and non-white.

The second stage of the analysis included univariate analyses to assess variation within the sample, bivariate analyses to determine relationships between the independent and dependent variables, and tests for multicollinearity among independent variables. The third stage was the multivariate logistic regression. Logit models were chosen because this researcher is examining the effects of students’ background characteristics and college performance indicators on the dichotomous nature of the students’ persistence outcome variables. Logistic regression models estimate the probability of an event occurring (Field, 2013).

In order to address research question one, binary logistic regression began with an analysis of the predictability of a binary outcome for each of the students’ background characteristics and college performance indicators of learning community students’ persistence to the subsequent Spring or Fall semester. Two separate models were used. One model used students’ persistence into the subsequent semester after initial enrollment as a criterion variable, and the second model used students’ persistence to the third semester in college as the criterion variable. The predictor variables representing students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, and received financial aid) and college performance indicators (e.g., pass developmental math, pass developmental English, pass student success course, and college GPA) were the same for both models.

The second research question was tested with additional logistic regression models to assess the interactive predictability of students’ background characteristics (e.g., age, race and
ethnicity, gender, high school GPA 76 and above, & financial aid) and college performance indicators (e.g., pass developmental math, pass developmental English, pass student success course, & college GPA 2.0 and above) using the same dependent variables in student persistence (e.g., subsequent semester, enrolled in college one year later). Building upon the original model developed examining the direct relationship of each independent variable addressed in the first research question, the second research question was addressed by testing selected interactions based on the literature and in accordance with the hypotheses offered above. The following variables were created and added to the model to determine the relationship the interaction has on the likelihood of persistence: Pass Remedial Math*Pass Student Success Course; Male*Pass Remedial Math Course; Male*Pass Student Success Course; Pass Student Success Course*Non-Traditional Age; HS GPA*College GPA; Non-Traditional Age*Male and HS GPA 76 and above*Received Financial Aid. In essence, additional independent variables were created by multiplying or combining the values of two variables to test their relationship with persistence. A simultaneous technique was used to test the effects of the interactive variables within the model.

In order to determine the statistical significance of each variable within the model, a significance value of p=.05 was used to determine the significance in several tests. The first test, an Omnibus Test of Model Coefficients was used to examine not only the logistic regression model itself, it also tested whether or not the predictor variables in the model improved the prediction of the criterion variable (Meyers, Gamst, & Guarino, 2006). The main test used was the Wald Test, which was performed to test the unique contribution of each coefficient within the logistic regression models. These tests and models resulted in the determination of the significance of students’ background characteristics and college performance indicators on the
prediction of developmental education learning community students’ persistence.

Validity, Reliability, and Generalizability

Validity. Anytime researchers are working with observational data, problems with validity and measurement error are likely to arise (Frankel et al., 2012). Errors in data entry, coding, and mismeasurement of variables can lead to biased results, which, in turn, can lead to incorrect conclusions regarding relationships between variables. The data used in this study were collected by the participating college, which obtained students’ background data directly from the students’ applications for admissions, or by a member of the staff inputting information into the record system of the institution. College performance measures were entered into the system as the information became available, typically from the instructor of record for the particular course. Though human error in data entry was possible, the college attempted to mitigate this concern by cross checking for consistency across multiple forms (e.g., college admissions application, financial aid forms, and, registration forms) that require the same information, and by having college staff review the information regularly to ensure accuracy. In addition, once the data were received, the information was thoroughly examined for inconsistencies and outliers.

A second threat to validity was related to the implementation of the learning community. Since multiple faculty members across multiple sections were simultaneously teaching the students included in the sample, implementation fidelity of the learning community program was a concern. Though faculty assigned to teach the learning community courses all had noteworthy experience, that relationships found using the above-mentioned analytic strategy were the result of differences in faculty teaching styles and classroom environments is possible. However, academic years where students enrolled in the learning community were controlled for in each of
the logistic regression models created to address the research questions. Also, this study was not looking at the effect of the community, rather the predictability of multiple independent variables representing students’ backgrounds and college performances.

**Reliability.** Reliability is related to the consistency of information provided by an instrument (Frankel et al., 2012). The data used in this study was institutional data. One possible threat to the reliability of data used in this study was the chance of incorrect information being entered into the student record system of the participating institution. As mentioned with the threat identified for validity, these threats to data reliability were mitigated by institutional procedures, as students’ background information was cross-checked for consistency as students often had to fill out multiple forms (e.g., college admissions application, financial aid forms, registration forms, etc.) requiring the same information. College staff review this information regularly to ensure accurate student background information in the system.

**Generalizability.** Generalizability refers to the applicability of the results to others (i.e., people, institutions, etc.) (Light, Singer, & Willett, 1990). When considering population generalizability, in this research study data were limited to students participating in learning communities in a community college located in the Northeast. Therefore, findings from the study may only be generalizable to the participating institution, given the specific design of the learning community and perhaps the uniqueness of the students. Research on students enrolled in learning communities at other colleges employing different learning community protocols might produce different findings. However, given the independent variables used in this examination related to participation in a learning community, replication of the research design would be possible for examination of other college programs or services to better understand the relationships between student characteristics and the desired outcome of the college program or
service. The findings of this study may also identify unique interactions, previously not identified, to warrant additional research or replication methodologically to examine other interventions or services institutions use to support student persistence. Additionally, this study will contribute to enhancing the currency of literature relating to students; background characteristics and college performance indicators of community college students and their relationship with student persistence.

**Protection of Human Subjects**

This study involved no immediate threat to human subjects. The identity of the participants was anonymous to the researcher as no personal identifiers were included within the data once it was obtained by the IR office at the participating institution. Given the quantitative design employed, the researcher had no interactions or contact with any of the participants. The identity of the participating institution was also protected and only described as a rural community college, located in the northeastern United States.

The research site was chosen not only for convenience, but also because the researcher was aware of the institutional offering of a learning community designed for students in need of remediation. Neither the chosen research site, nor any professional or personal relationships of the researcher, interfered with IRB approved research protocols, privacy of participants, or the results of this study. The President of the participating institution and the Director of Institutional Research gave permission for this research to be conducted using data from the institution’s Student Information System (i.e., Banner). After Northeastern University IRB granted permission for this research to move forward, the participating institution gave permission and released the data for the purpose of this study.
Summary

The research design and methodology employed in this study examined both the direct and interactive relationships students’ background characteristics and college performance indicators had on developmental education learning community persistence. The data used in this study were from a single community college located in the northeastern United States. The learning community design represented in this study included a developmental English and developmental math course, along with an intensive student success course. Multivariate logistic regression analysis was employed to address two research questions and test multiple hypotheses.
Chapter 4: Results

The purpose of this quantitative study was to explore the relationship between students’ background characteristics and college performance indicators with learning community developmental education students’ persistence. This section presents the results by providing the descriptive statistics for the study population and reports the findings of the statistical analysis conducted to address each research question by testing the selected variables (e.g., students’ background characteristics, and college performance indicators) as predictors for future college persistence, both in the subsequent semester and one year after initial college enrollment. In order to address the second research question, interactive variables were created and added to the model to examine the moderating effects using logistic regression techniques for the statistical analysis.

Data Cleaning and Transformation

Data were provided to the researcher from the participating research site directly. The received data needed to be transformed into a dichotomous form, given the research questions, analytic strategy, and variable types and definitions. Table 4.1 presents the variable type, definition, and values assigned to each independent variable to be included in this study.

Table 4.1

<table>
<thead>
<tr>
<th>Independent Variable Definitions</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Non-White</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Not Received Financial Aid</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pass Remedial Math Course</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>HS GPA 76 and Above</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>College GPA 2.0 and Above</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Since students from diverse racial or ethnic groups other than white were less than 10% of the sample, the data were transformed to a dichotomous form representing white and non-white students. Additionally, high school and college GPAs were transformed into dichotomous forms representing the general cutoff comparable to a C average. This cutoff was chosen because a C average and above are considered in good standing at the participating research site. No missing data identified in the sample needed to be addressed.

The criterion variable of student persistence was also created representing a student’s persistence to the subsequent semester after initial enrollment in college and participation in the learning community (i.e., Fall-to-Spring) \( (1 = \text{Yes}, \ 0 = \text{No}) \), as well as a student’s persistence one year later after initial enrollment in college (i.e., Fall-to-Fall) \( (1 = \text{Yes}, \ 0 = \text{No}) \). When the data cleaning and transformation were completed, the data were uploaded to SPSS version 23 for the analyses for descriptive statistics, bivariate analyses, and the logistic regression tests to address both research questions.

**Descriptive Statistics for Study Population**

This research was conducted using data from a public, rural, open access community college located in the northeastern United States. A purposive sample was used and was restricted to first-time, full-time students who enrolled between the Fall 2007 semester and the Spring 2014 semester in a first semester learning community designed for students who required remediation. All students in the sample were high school graduates.

Nearly 70% of the students who participated in the first semester developmental education learning community persisted into the subsequent semester after initial enrollment. Forty percent of learning community students persisted into the third semester or one year later. Table 4.2 presents the descriptive statistics of the sample in relation to student persistence.
Since fewer new students enrolled at the institution in the Spring semester compared to a typical Fall semester, a disparity between typical enrollments in a Fall semester compared to a Spring semester resulted. Table 4.3 presents the descriptive statistics of the sample relating to the number of students who enrolled in the learning community by the academic semester start.

### Table 4.3

*Descriptive Statistics for Overall Sample and Academic Semester Start (N = 424)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Semester Start</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall 2007</td>
<td>13.4</td>
<td>-</td>
<td>-</td>
<td>57</td>
</tr>
<tr>
<td>Spring 2008</td>
<td>1.9</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>Fall 2008</td>
<td>14.9</td>
<td>-</td>
<td>-</td>
<td>63</td>
</tr>
<tr>
<td>Spring 2009</td>
<td>3.1</td>
<td>-</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>Fall 2009</td>
<td>13.7</td>
<td>-</td>
<td>-</td>
<td>58</td>
</tr>
<tr>
<td>Spring 2010</td>
<td>1.4</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>16.5</td>
<td>-</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>Spring 2011</td>
<td>1.4</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Fall 2011</td>
<td>10.4</td>
<td>-</td>
<td>-</td>
<td>44</td>
</tr>
<tr>
<td>Spring 2012</td>
<td>1.4</td>
<td>-</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td>Fall 2012</td>
<td>8.7</td>
<td>-</td>
<td>-</td>
<td>37</td>
</tr>
<tr>
<td>Spring 2013</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Fall 2013</td>
<td>9.9</td>
<td>-</td>
<td>-</td>
<td>42</td>
</tr>
<tr>
<td>Spring 2014</td>
<td>1.7</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: M= mean; SD=standard deviation; n=number of students enrolled in academic semester start per term
The sample had more female students (55%) than male students. Students in the sample were also predominantly white (92.2%) and traditional aged (86.8%), representing the category of 17-23 years of age. The data presented Table 4.4 are similar to the general institutional data representing the demographics and background characteristics of their students. The two exceptions are the percent of students who are non-traditional aged, as well as the average high school GPA. The average high school GPA may be higher, as not all students enrolling in the college require remediation.

Table 4.4

*Descriptive Statistics for Overall Sample and Student Background Characteristic Variables (N = 424)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>42.7</td>
<td>.43</td>
<td>.495</td>
</tr>
<tr>
<td>Female</td>
<td>57.3</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Non-White</td>
<td>7.8</td>
<td>.08</td>
<td>.268</td>
</tr>
<tr>
<td>White</td>
<td>92.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
<td>13.2</td>
<td>.13</td>
<td>.339</td>
</tr>
<tr>
<td>Traditional Age</td>
<td>86.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No Financial Aid Received</td>
<td>28.1</td>
<td>.28</td>
<td>.450</td>
</tr>
<tr>
<td>Financial Aid Received</td>
<td>71.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High School GPA 76 and Above</td>
<td>49.5</td>
<td>.4953</td>
<td>.50057</td>
</tr>
<tr>
<td>High School GPA 75.9 and Below</td>
<td>50.5</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: M= mean; SD=standard deviation

Based on the selected college performance indicators for this study, students passed the required student success course within the learning community at a higher rate (63%) than the required remedial math (43.9%) or the required remedial English course (55.9%). Although the sample contained nearly even percentages of students with HS GPAs of 76 and above and 75.9 and below, a great disparity existed with college GPAs, considering the division into 2.0 and
above and 1.99 and below. Table 4.5 presents the descriptive statistics for the sample, considering the independent variables representing college performance indicators:

Table 4.5

Descriptive Statistics for Overall Sample and College Performance Indicators \((N = 424)\)

<table>
<thead>
<tr>
<th>Variable</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Remedial Math Course</td>
<td>43.9</td>
<td>.44</td>
<td>.497</td>
</tr>
<tr>
<td>Failed Remedial Math Course</td>
<td>56.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
<td>55.9</td>
<td>.56</td>
<td>.497</td>
</tr>
<tr>
<td>Failed Remedial English Course</td>
<td>44.1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
<td>63.2</td>
<td>.63</td>
<td>.483</td>
</tr>
<tr>
<td>Failed Student Success Course</td>
<td>36.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>College GPA 2.0 and Above</td>
<td>44.8</td>
<td>.4481</td>
<td>.49789</td>
</tr>
<tr>
<td>College GPA 1.99 and Below</td>
<td>55.2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: M= mean; SD=standard deviation

The descriptive statistics provide an overview of the overall persistence rates, background characteristics of students who participated in learning communities, as well as the college performance of the students represented in the sample. With the exception of the academic start term, the number of cases represented in the first column \% represents the number of students composing the reference groups within the variable. Each reference category listed above has more than the recommended 50 cases, generally sought to conduct logistic regression analysis.

In order to address the second research question in this study, interactive variables were created that were both theoretically relevant and that had been identified in prior literature. Table 4.6 presents the descriptive statistics of the interactive variables to be tested in the analysis.
Table 4.6

Descriptive Statistics for Overall Sample and Interactive Variables (N = 424)

<table>
<thead>
<tr>
<th>Variable</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass Math &amp; Student Success Course</td>
<td>41.0</td>
<td>.4104</td>
<td>.49248</td>
</tr>
<tr>
<td>Gender &amp; Pass Remedial Math Course</td>
<td>16.7</td>
<td>.1675</td>
<td>.37382</td>
</tr>
<tr>
<td>Gender &amp; Pass Student Success Course</td>
<td>23.3</td>
<td>.2335</td>
<td>.42355</td>
</tr>
<tr>
<td>Non-Traditional Age &amp; Pass Student Success Course</td>
<td>9.7</td>
<td>.0967</td>
<td>.29530</td>
</tr>
<tr>
<td>HS GPA of 76 and Above &amp; College GPA of 2.0 and Above</td>
<td>27.4</td>
<td>.2736</td>
<td>.44633</td>
</tr>
<tr>
<td>Traditional Age &amp; Gender</td>
<td>4</td>
<td>.4104</td>
<td>.19641</td>
</tr>
<tr>
<td>HS GPA of 76 and Above &amp; Financial Aid Received</td>
<td>11.6</td>
<td>.1156</td>
<td>.32008</td>
</tr>
</tbody>
</table>

Note: M= mean; SD=standard deviation

**Research Question One**

Is there a relationship between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) with the persistence of students enrolled in a learning community?

Prior to conducting the logistic regression analyses, a bivariate analysis was conducted using a Chi-Square test. Also independent variables were tested to ensure that multicollinearity did not exist. After the bivariate analysis, assumption checking was also completed, and all assumptions were met, allowing for progression to begin the analytic strategy to address research question one and research question two.

Logistic regression was used to determine the relationships between the selected independent variables representing students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA 76 and above, received financial aid) and college performance indicators (e.g., college GPA 2.0 and above, pass developmental math course, pass...
developmental English course, pass student success course). Two dependent variables were tested representing students’ persistence to the subsequent semester after initial enrollment in college and participation in the learning community (i.e., Fall-to-Spring) as well as students’ persistence one year later after initial enrollment in college (i.e., Fall-to-Fall). The forced entry method was used for both analyses, as all independent variables were entered in at the same time in SPSS to determine their predictability.

In order to determine the statistical significance of each variable within the model, a Wald Test was performed to test the unique contribution of each coefficient within the logistic regression models. These tests and models determined the significance of students’ background characteristics and college performance indicators as predictors of the persistence of college students in the developmental education learning community. Table 4.7 presents the results for the first binary logistic regression model addressing research question one looking at the direct associations in relation to students’ persistence into the subsequent semester after enrolling in the learning community.

Table 4.7

RQ 1: Logistic Regression on Student Persistence to Subsequent Semester (N = 424)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-.072</td>
<td>.278</td>
<td>.067</td>
<td>1</td>
<td>.796</td>
<td>.931</td>
</tr>
<tr>
<td>Non-White</td>
<td>.403</td>
<td>.531</td>
<td>.576</td>
<td>1</td>
<td>.448</td>
<td>1.496</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
<td>.294</td>
<td>.468</td>
<td>.394</td>
<td>1</td>
<td>.530</td>
<td>1.341</td>
</tr>
<tr>
<td>Not Received Financial Aid</td>
<td>-.329</td>
<td>.297</td>
<td>1.225</td>
<td>1</td>
<td>.268</td>
<td>.720</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
<td>.799</td>
<td>.353</td>
<td>5.123</td>
<td>1</td>
<td>.024</td>
<td>2.224</td>
</tr>
<tr>
<td>Pass Remedial Math Course</td>
<td>1.208</td>
<td>.355</td>
<td>11.585</td>
<td>1</td>
<td>.001</td>
<td>3.348</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
<td>1.308</td>
<td>.353</td>
<td>13.761</td>
<td>1</td>
<td>.000</td>
<td>3.700</td>
</tr>
<tr>
<td>HS GPA 76 and Above</td>
<td>-.577</td>
<td>.288</td>
<td>4.009</td>
<td>1</td>
<td>.045</td>
<td>.561</td>
</tr>
<tr>
<td>College GPA 2.0 and Above</td>
<td>.781</td>
<td>.364</td>
<td>4.615</td>
<td>1</td>
<td>.032</td>
<td>2.184</td>
</tr>
</tbody>
</table>

Note: *Academic year enrolled is controlled for in the model.
As presented in Table 4.7, with a significance level of \( p=0.000 \) and odds ratio (OR) of 3.70, students who pass the student success course are predicted most likely to persist to the subsequent semester. Passing the remedial math course \( (p=0.001, \text{OR}=3.348) \) and passing the remedial English course \( (p=0.024, \text{OR}=2.22) \) were also found to be statistically significantly associated with persistence. In relation to college performance indicators, college GPA was found to be significantly associated with persistence \( (p=0.032) \). The only students’ background characteristic identified as being statistically significantly associated with persistence was high school GPA \( (p=0.045, \text{OR}=5.61) \). All other tested students’ background characteristics included in the model were not statistically significantly associated with persistence into the subsequent semester.

Given the results presented in Table 4.7, the following null hypotheses offered are accepted when considering the criterion variable of learning community persistence into the subsequent semester:

\( H_0^1: \) There is no significant relationship between student age and developmental learning community student persistence.

\( H_0^2: \) There is no significant relationship between race/ethnicity and developmental learning community student persistence.

\( H_0^3: \) There is no significant relationship between student gender and developmental learning community student persistence.

\( H_0^5: \) There is no significant relationship between receipt of financial aid and developmental learning community student persistence.

Given the results presented in Table 4.7, the following alternative hypotheses offered are accepted:
H14: There is a significant relationship between students’ high school GPA and developmental learning community students’ persistence.

H16: There is a significant relationship between students’ college GPA and developmental learning community students’ persistence.

H17: There is a significant relationship between students’ passing developmental math course and developmental learning community students’ persistence.

H18: There is a significant relationship between students’ passing developmental English course and developmental learning community students’ persistence.

H19: There is a significant relationship between students’ passing the student success course and developmental learning community students’ persistence.

The second model developed to address research question one was using students’ persistence in college one year later as the dependent variable. The same independent variables used in the first model representing students’ background characteristics and college performance indicators were also included in this second model. Persisting in college one year later was defined as students who were enrolled in both the subsequent semester after initial enrollment in the learning community and continued enrollment into their third semester in college. Table 4.8 presents the results of the logistic regression model examining the direct association with persistence in college one year later.
In this model, three independent variables representing students who passed the remedial math course (p=.006), students who passed the student success course (p=.014), and students with a college GPA of 2.0 and above (p=.000) were found to be statistically significantly associated with third semester persistence. Students with an earned college GPA of 2.0 and above were found to be most likely to persist in college one year later with an odds ratio of 3.30.

When comparing the results on this model with the first model looking at the odds for enrollment into the subsequent semester, the passing of the remedial English course, and high school GPA are now not considered statistically significant. In this model, none of the variables representing student background characteristics (e.g., gender, age, race/ethnicity, etc.) were found to be statistically significantly associated with third semester persistence in college.

**Research Question Two**

How do interactions between students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) relate to the persistence of learning community students?
The second research question allows for investigating the relationship of variables when combined with another variable to form an interaction as one independent variable. The interactive variables included were selected variables representing students’ background characteristics and college performance indicators for education learning community students and students’ persistence. Similar to analysis used for research question one, logistic regression was used to determine the significance of the relationships among the selected independent variables representing students’ background characteristics and college performance indicators. Based on prior literature and theoretical relevance, the following variables were created and added to the model to determine the relationship the interaction had on the likelihood of persistence: Pass Remedial Math*Pass Student Success Course, Male*Pass Remedial Math Course, Male*Pass Student Success Course, Pass Student Success Course*Non-Traditional Age, HS GPA*College GPA, Non-Traditional Age*Male, and HS GPA 76 and above*Received Financial Aid. Two dependent variables were tested representing students’ persistence to the subsequent semester after initial enrollment in college and participation in the learning community (i.e., Fall-to-Spring) as well as students’ persistence one year later after initial enrollment in the learning community (i.e., Fall-to-Fall).

Table 4.9 presents the results of the binary logistic regression model looking at both direct and interactive variables in relation to the prediction of students to persist into the subsequent semester after participating in the learning community.
Table 4.9

**RQ 2: Logistic Regression on Student Persistence to Subsequent Semester (N = 424)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
<th>df</th>
<th>p</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>.297</td>
<td>.371</td>
<td>.641</td>
<td>1</td>
<td>.423</td>
<td>1.346</td>
</tr>
<tr>
<td>Non-White</td>
<td>.458</td>
<td>.505</td>
<td>.823</td>
<td>1</td>
<td>.364</td>
<td>1.581</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
<td>-.769</td>
<td>.877</td>
<td>.767</td>
<td>1</td>
<td>.381</td>
<td>.464</td>
</tr>
<tr>
<td>Not Received Financial Aid</td>
<td>-.070</td>
<td>.384</td>
<td>.033</td>
<td>1</td>
<td>.856</td>
<td>.933</td>
</tr>
<tr>
<td>Pass Remedial Math Course</td>
<td>3.012</td>
<td>1.158</td>
<td>6.766</td>
<td>1</td>
<td>.009</td>
<td>2.331</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
<td>.590</td>
<td>.337</td>
<td>3.063</td>
<td>1</td>
<td>.080</td>
<td>1.805</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
<td>2.054</td>
<td>.474</td>
<td>18.749</td>
<td>1</td>
<td>.000</td>
<td>7.802</td>
</tr>
<tr>
<td>HS GPA 76 and Above</td>
<td>-.142</td>
<td>.381</td>
<td>.139</td>
<td>1</td>
<td>.710</td>
<td>.868</td>
</tr>
<tr>
<td>College GPA 2.0 and Above</td>
<td>.999</td>
<td>.524</td>
<td>3.641</td>
<td>1</td>
<td>.056</td>
<td>2.717</td>
</tr>
<tr>
<td>Pass Math &amp; Student Success Course</td>
<td>-2.422</td>
<td>1.174</td>
<td>4.260</td>
<td>1</td>
<td>.039</td>
<td>.089</td>
</tr>
<tr>
<td>Male &amp; Pass Remedial Math Course</td>
<td>.242</td>
<td>.723</td>
<td>.112</td>
<td>1</td>
<td>.738</td>
<td>1.273</td>
</tr>
<tr>
<td>Male &amp; Pass Student Success Course</td>
<td>-.985</td>
<td>.636</td>
<td>2.400</td>
<td>1</td>
<td>.121</td>
<td>.373</td>
</tr>
<tr>
<td>Non-Traditional Age &amp; Pass Student Success Course</td>
<td>.454</td>
<td>.975</td>
<td>.217</td>
<td>1</td>
<td>.641</td>
<td>1.575</td>
</tr>
<tr>
<td>HS GPA &amp; College GPA</td>
<td>-.637</td>
<td>.624</td>
<td>1.044</td>
<td>1</td>
<td>.307</td>
<td>.529</td>
</tr>
<tr>
<td>Non-Traditional Age &amp; Male</td>
<td>.298</td>
<td>.960</td>
<td>.096</td>
<td>1</td>
<td>.756</td>
<td>1.347</td>
</tr>
<tr>
<td>HS GPA 76 and Above &amp; No Financial Aid</td>
<td>-.404</td>
<td>.574</td>
<td>.495</td>
<td>1</td>
<td>.482</td>
<td>.668</td>
</tr>
</tbody>
</table>

*Note: *Academic Year Enrolled is Controlled for in the Model

Similar to the logistic regression model used to address research question one, a student passing the student success course (p= .000) as well as the remedial math course (p= .009) is still considered statistically significant. The inclusion of interactive variables tested in this model only had one statistically significant finding. That variable, passing of the remedial math course and the student success course, was found to be statistically significant at a level of p=.039, with an odds ratio of .089. Also, the inclusion of the interactive variables moderated the statistical significance of passing the remedial English course so that it is now not a statistically significant predictor of re-enrollment into the subsequent semester. The findings related to direct associations in this model were similar to the model created testing only direct associations as
passing the student success course at $p=0.000$ level of significance (OR=7.802) and the passing of the remedial math course at $p=0.009$ (OR=2.331) were both still statistically significant predictors of future persistence to the subsequent semester.

As a result, when considering the interactive relationships of selected theoretically relevant variables representing the combination of selected students’ background characteristics and college performance indicators with the likelihood of persistence to the subsequent semester, the following null hypotheses were offered and accepted:

$H_{011}$: There is not a significant relationship between the students’ gender who passed the math course, with the likelihood of persistence.

$H_{012}$: There is not a significant relationship between the students’ gender who passed the student success course, with the likelihood of persistence.

$H_{013}$: There is not a significant relationship between non-traditional age students who passed the student success course, with the likelihood of persistence.

$H_{014}$: There is not a significant relationship between students with the highest high school GPA and college GPA, with the likelihood of persistence.

$H_{015}$: There is not a significant relationship between non-traditional age male students, with the likelihood of persistence.

$H_{016}$: There is not a significant relationship between students with a higher high school GPA and above, and receipt of financial aid, with the likelihood of persistence.

Given the results of the statistically significant association found among the variables pass the remedial math course and pass the student success course with the likelihood of persistence to the subsequent semester, the following alternative hypothesis was accepted:
H10: There is a significant relationship between students who pass remedial math course and the student success course, with student persistence.

The second model created to address research question two used the dependent variable of students’ persistence in college one year later after initial participation in the learning community. The same independent variables in the first model examining likelihood of persistence to a subsequent semester were included in this logistic regression analysis. All variables were entered into the model at the same time. Table 4.10 presents the results considering the direct and interactive associations of variables with the persistence of students enrolled in college one year later.

Table 4.10

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E</th>
<th>Wald</th>
<th>df</th>
<th>P</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>-.710</td>
<td>.528</td>
<td>1.805</td>
<td>1</td>
<td>.179</td>
<td>.492</td>
</tr>
<tr>
<td>Non-White</td>
<td>-.032</td>
<td>.451</td>
<td>.05</td>
<td>1</td>
<td>.943</td>
<td>.968</td>
</tr>
<tr>
<td>Non-Traditional Age</td>
<td>-1.601</td>
<td>1.262</td>
<td>1.610</td>
<td>1</td>
<td>.204</td>
<td>.202</td>
</tr>
<tr>
<td>Not Received Financial Aid</td>
<td>.471</td>
<td>.395</td>
<td>1.425</td>
<td>1</td>
<td>.233</td>
<td>1.602</td>
</tr>
<tr>
<td>Pass Remedial Math Course</td>
<td>2.214</td>
<td>.791</td>
<td>7.833</td>
<td>1</td>
<td>.005</td>
<td>9.152</td>
</tr>
<tr>
<td>Pass Remedial English Course</td>
<td>.447</td>
<td>.324</td>
<td>1.895</td>
<td>1</td>
<td>.169</td>
<td>1.563</td>
</tr>
<tr>
<td>Pass Student Success Course</td>
<td>.837</td>
<td>.458</td>
<td>3.335</td>
<td>1</td>
<td>.068</td>
<td>2.310</td>
</tr>
<tr>
<td>HS GPA 76 &amp; Above</td>
<td>.433</td>
<td>.406</td>
<td>1.135</td>
<td>1</td>
<td>.287</td>
<td>1.542</td>
</tr>
<tr>
<td>College GPA 2.0 &amp; Above</td>
<td>1.108</td>
<td>.399</td>
<td>7.692</td>
<td>1</td>
<td>.006</td>
<td>3.027</td>
</tr>
<tr>
<td>Pass Math &amp; Student Success Course</td>
<td>-1.380</td>
<td>.796</td>
<td>3.010</td>
<td>1</td>
<td>.083</td>
<td>.252</td>
</tr>
<tr>
<td>Male &amp; Pass Remedial Math Course</td>
<td>-.461</td>
<td>.549</td>
<td></td>
<td>1</td>
<td>.401</td>
<td>.631</td>
</tr>
<tr>
<td>Non-Traditional Age &amp; Pass Student Success Course</td>
<td>1.753</td>
<td>1.278</td>
<td>1.883</td>
<td>1</td>
<td>.170</td>
<td>5.774</td>
</tr>
<tr>
<td>HS GPA &amp; College GPA</td>
<td>-.135</td>
<td>.500</td>
<td>.073</td>
<td>1</td>
<td>.788</td>
<td>.874</td>
</tr>
<tr>
<td>Non-Traditional Age &amp; Male</td>
<td>.751</td>
<td>.963</td>
<td>.757</td>
<td>1</td>
<td>.384</td>
<td>2.119</td>
</tr>
<tr>
<td>HS GPA 76 and Above &amp; No Financial Aid</td>
<td>-.854</td>
<td>.552</td>
<td>2.393</td>
<td>1</td>
<td>.122</td>
<td>.426</td>
</tr>
</tbody>
</table>

Note: Academic year enrolled is controlled for in the model.
Passing the remedial math course and having a college GPA of 2.0 and above were the only statistically significant variables found in this model as predictors for persistence in college one year later after enrollment in the learning community. Students with a college GPA of 2.0 and above were over three times more likely (OR=3.027) to persist in college one year after initial enrollment in this model as depicted in Table 4.10. Passing the remedial math course was found to be statistically significantly associated with persistence and a strong predictor of future persistence (p=.005, OR= 9.152). Unlike the results presented in Table 4.8, none of the interactive variables tested in this model were found to be statistically significant. The closest interactive variable to being considered statistically significant were students who passed the remedial math course and student success course at a significance level of p=.083. In addition, the inclusion of the additional interactive variables moderated the significance of the passing of the student success course enough to now not be considered a statistically significant predictor of persistence in college one year later.

Summary

This chapter presented the results and findings for each of the two research questions, the descriptive statistics of the sample, and statistical analyses. The sample included 424 students who enrolled in this learning community between the Fall 2007 semester and the Spring 2014 semester. In summary, the major findings in this study were the passing of the remedial math course, student success course and college GPA of 2.0 and above were consistently found to be a statistically significant predictor of future persistence for learning community students. Other than HS GPA, no student background characteristics were found to be statistically significant.
Chapter 5: Discussion of Research Findings

This study investigated the relationship between student background characteristics and college performance indicators with learning community college students’ persistence. In using a rural community college located in the northeastern United States as a research site, the learning community design in this study was for first-time, full-time students who were required to enroll in both a remedial English course and a remedial math course. As a result of these placement requirements, the students chose to enroll in a learning community during their first semester in college. Binary logistic regression techniques were used to examine both the direct association and interactive association of select theoretically relevant variables with student persistence. The following chapter discusses the results presented in Chapter 4, and implications of the findings, and suggests further research needed in this area.

Results and Discussion of Research Question #1

The first research question tested whether the direct associations of selected students’ background characteristics (e.g., age, race and ethnicity, gender, high school GPA, received financial aid) and college performance indicators (e.g., college GPA, pass developmental math course, pass developmental English course, pass student success course) predicted the persistence of students enrolled in a learning community. The direct associations most significant in predicting the likelihood of future persistence into the subsequent semester for learning community students in this study was passing the remedial English, math and student success courses respectively. In addition, students with college GPA’s of 2.0 and above, were also more likely to persist both into the subsequent semester and in college one year later. The single variable representing student background characteristics found to be statistically significant was students with a high school GPA of 76 and above. Three independent variables
(pass remedial math course, pass student success course, and college GPA 2.0 and above) were found to be statistically significantly associated with persistence in college one year later.

Unlike findings reported in prior literature (e.g., Fike & Fike, 2008; Wessel et al., 2006; Wlodkowski et al., 2002), the results of research question one were that the receipt of financial aid was not found to be a significant predictor of future persistence in any of the models. Although the gender ratio was similar in this sample as it was for the research institution as whole, the gender of students was not found to be statistically significantly related to persistence in college either. One of the findings related to students’ background characteristics that had been more consistent in prior literature was the association race and ethnicity with persistence (Bailey et al., 2010; Roksa et al., 2009). Although, no significant findings in this study were identified for the association of race and ethnicity with persistence, the sample in this study did not include enough racial or ethnical diversity to best test this characteristic in this study.

Several college performance indicators were found to be statistically significant. The results of the positive relationship found between passing a student success course and improving the likelihood of future persistence is similar with prior literature (Cho & Karp, 2013; Zeidenberg et al., 2007). The statistically significant association of passing remedial English, and passing remedial math with persistence are consistent with prior literature. College GPA was also found to be statistically significantly associated with students’ enrollment into the subsequent semester, consistent with the findings of Pascarella and Terenzini (2005). Pascarella and Terenzini (2005) found that college grades are the single best predictor of student persistence and students who had GPA of 2.0 and below after the first semester in college had only a 57% chance of persisting to the second year.
High school GPA of 76 and above was only found to be statistically significantly associated with persistence to subsequent semester in the first model. One consideration for this result is that in this study no students were considered ready for college level math or English. All students included in the sample were required to enroll into the same remedial course regardless of high school GPA, their readiness in those disciplines was determined to be relatively equal to one another, based on institutional placement.

**Results and Discussion of Research Question #2**

Building on the first model to test research question one, the second research question introduced interactive variables into the model to determine their significance in predicting the likelihood of future persistence in both the subsequent semester and in enrollment in college one year later. The following interactive variables were created and introduced in order to test the second research question of this study: Pass Remedial Math*Pass Student Success Course; Male*Pass Remedial Math Course; Male*Pass Student Success Course; Pass Student Success Course*Non-Traditional Age; HS GPA*College GPA; Non-Traditional Age*Male and HS GPA 76 and above*Received Financial Aid.

Passing the student success course, passing the remedial math course, along with the new interactive variable representing passing of remedial math and the student success course, in relation to predicting students’ reenrollment into the subsequent semester were found to be statistically significant. Given the influence of the additional variables within the model, the predictive value of passing the student success course and passing the remedial math course are consistent with the initial findings of the first model created to address research question one.

The second model created to examine research question two included the same independent variables representing both direct and interactive variables, but tested the
relationship with predicting students’ persistence into the third semester, or one year later, after initial enrollment in the learning community. The results of this model were that only the passing of the remedial math course and having a college GPA of 2.0 and above were significantly associated with students’ enrollment in the third semester. None of the direct or interactive variables representing student background characteristics were found to be statistically significant in either model which tested research question number two.

The results of this study are in line with prior literature in that over time the students with higher college grade point averages are most likely to persist. Additionally, the effects of those averages will dissipate the effects of other students’ background characteristics in relation to the likelihood of future persistence (Nakajima et al., 2012; Porchea et al., 2010). In this study, having a college GPA of 2.0 and higher better predicted students’ persistence for the third semester of college than any other variable considered in the model did. The additional variables in the first model dissipated the effects passing the remedial English course had on predicting future persistence into the subsequent semester. Similarly, in the second model, the additional variables moderated the effect passing the student success course had on predicting future persistence one year later in college.

Unlike Wolfle’s (2012) findings that age and race or ethnicity were significant predictors of retention. This study did not find any statistically significant evidence of race or ethnicity and age and its relation to future persistence to the subsequent semester or one year later in college. However, given the relatively small sample of non-white students in this study, perhaps a more diverse sample would have led to a different finding. Similar to Wolfle’s (2012) findings, only one significant interactive effect was found in either model and that was that passing of the remedial math course and student success course increased the likelihood of future persistence to
the subsequent semester. Also, age was not found to be significant in any of the models; however, the mean age of the sample was approximately 20 years of age. A more diverse sample with higher representation of non-traditional aged students may have led to different findings related to age effects.

**Implications**

Given that the purpose of this study was to explore the relationship between students’ background characteristics and college performance indicators of students who enrolled in a learning community, the findings of this study are relevant and important for both practice and research. The implications for research are important, both in terms of the contribution towards learning community student persistence literature and the use of a methodological approach that could be replicated. The implications for practice are also prevalent as consideration can be given to how the results of this study should inform both student support practitioners, learning community designers and faculty for developing strategies to support student course success, resulting in increased likelihood of future persistence.

**Implications for practice.** The implications for practice are clear as they relate to the relationship between passing required remediation coursework and the likelihood of future persistence for students enrolled in the learning community. From a community college administrator or faculty perspective, this is important and provides meaningful results. The focus of faculty, and college support staff should be on engaging students to try to keep students connected with the resources necessary to increase their passing remedial courses. As presented in the findings of this study, the more students are successful in completing the required remedial courses, the more likely that they will persist into the future.
Focus should also be given to increasing the number of students who pass the student success course and the remedial math course. With only 63% of the students passing the student success course and 44% of the students passing the remedial math course during the learning community semester, efforts to improve the pass rate could predict an increase in the likelihood of students’ future persistence. Although not as statistically significant as the passing of a remedial math or student success course, similar consideration should also be given to improving the pass rates for remedial English as only 60% of the students passed that requirement during the learning community semester.

With a high percentage of community college students requiring some level of remediation, improvements in students’ persistence and ultimate level of degree completion is important, not only for the individual students, but also for the institution. Many areas of the country, particularly the northeastern United States, are seeing a decline in projected high school populations; therefore, improving the persistence of students who enroll in the college in the first place is important for the financial vitality of the college into the future.

Beyond academic preparation, student background characteristics representing race or ethnicity, received financial aid, gender and age were not found to be significant predictors of students’ persistence. One reason for this may be that the population in this study was not particularly diverse racially/ethnically or by age. High percentages of the student populations represented in this sample were considered traditional age of 23 years or younger and over 92% of the population were white. One indicator of persistence reported in the literature (Fike & Fike, 2008), the receipt of financial aid, was not found to be significant either directly or when formed as an interaction with another variable in this study.
From the practitioner’s perspective, that the students’ background characteristics did not have a significant effect on the likelihood of future persistence in college is good. Although in prior literature, students who enrolled with a better level of academic preparation (e.g., higher HS GPA, college admission exam scores) were consistently more likely to persist (Hirshy et al., 2011), the sample in this study does not represent the full picture of incoming college students attending the community college research site. All of the students in the current study were required to take remedial math and English courses based on institutional placement policies. Prior literature has indicated that students who required more than one course of remediation were less likely to persist compared to students who did not require remediation at all or just one course in remediation (James et al., 2002).

Moving forward, practitioners should continue to emphasize the importance of enrolling in, and completing, required remedial coursework. In addition, learning community faculty should evaluate support systems and the infrastructure in place to promote academic support systems for students enrolled in the learning community to increase the pass rates of the courses included in the learning community. Perhaps more intrusive supports or early detection of students’ not performing on a trajectory for successful course completion should be developed to increase the percentage of students who pass those required courses to increase the likelihood of future persistence.

Given the significant relationship found between passing remedial coursework and future persistence, particularly in math, academic affairs administration and faculty could look at their course designs, particularly in remedial math, to see when or if early indicators of students’ not being successful appear. Attention should be paid to what points in the semester students typically stop attending class and to topics within the courses tend to be most difficult for
students. Overall, a more intrusive identification and support system for students who are struggling in these courses might result in a higher percentage of students persisting in and passing their coursework.

**Implications of research and future research consideration.** From the research perspective, more research is needed to examine the relationship between both direct and interactive variables with developmental college students’ persistence. The methodological approach used in this study should be replicated in assessing other learning community designs to see if students’ background characteristics have any significant effect on predicting future persistence. Although student background characteristics were not found to have a significant effect in this study, the students of diverse racial and ethnic groups were less than 10% of the sample. In addition, the sample predominantly had traditional aged students represented, and all of those in the sample were not college ready in both English and math. However, success in certain courses may have more of a significant effect in predicting students’ future persistence. This type of information on course success is important for practitioners as new interventions and support services could be developed.

Future researchers should also look at students’ background characteristics and their association with successful course completion. This type of study would be important in understanding possible predictors of student backgrounds characteristics in relation to persistence. Given prior literature on the high percentage of students who never complete required remedial courses or sequences (Roksa et al., 2009), looking at various background characteristics in relation to course completion may improve intervention or support designs upon entry into the college for those students identified as being at-risk.
Future research using interactive terms continues to be important, as the combination of variables can increase the significance value, and helps to better understand how multiple factors may be a better indication in measuring the relationship and/or the effect the interaction has with a desired outcome. In this study, the additional interactive variables entered into a logistic regression model dissipated the significance of certain predictive variables, such as passing the student success course and passing remedial English. The inclusion of the interactive variables resulted in the variables representing college GPA of 2.0 and above and the passing of the remedial math course to become the most significant predictors for enrolled in college one year later. Additional research should be conducted exploring interactions in relation to learning community students’ future persistence, especially with a more racially or ethnically diverse sample. Also, if the learning community design is not restricted to only students who require remediation, prior academic achievement (e.g., high school GPA) may be a particularly important predictor, as has been mentioned in other prior literature.

Additional variables could be considered based on theoretical relevance for student integration. Depending on available data, the more information representing students’ background characteristics, student engagement and college performance available to be tested in the model, the better an understanding practitioners may have on the predictive influence those variables may have on future persistence.

Limitations

The data for the study were limited to information gathered in semesters beginning in Fall 2007 and ending in Spring 2014. The study only included the students who participated in the learning community. No conclusions can be drawn on the effect the learning community itself
has on students’ persistence. This study only focused on the students’ background characteristics and selected college performance indicators as predictors for students’ future persistence.

When considering the generalizability of the study, limitations exist. The specific design of the learning community, including the required remedial courses, may limit the generalizability to other learning community designs and to other institutions. However, key findings related to the importance of successfully passing remedial courses, particularly math, and the positive influence of successfully passing the student success course within the community build upon and support prior literature.

Summary

One particular concern in higher education, especially in open access community colleges, is the high percentage of students who require remediation, along with the high attrition rates for those students. As a form of intervention or as a pedagogical approach to address these issues, one strategy institutions have used is learning communities. The use of learning communities has been found to have a positive effect on a remedial students’ persistence. Using Tinto’s (1993) theoretical framework for student integration, the purpose of the study was to explore the relationship between students’ background characteristics and college performance indicators with learning community students’ persistence. Prior literature had been primarily focused on the differences between students enrolled in learning communities compared to students who were not enrolled in a learning community; in these cases, learning communities had been found to have a positive effect on students’ persistence. This study was intended to contribute to the literature by looking at a particular learning community to explore indicators that best predicted the likelihood of students’ future persistence. The learning community in this study was designed to support students who required remediation in both math and English and
was offered to them during their first semester in college. The sample included 424 students who enrolled in this learning community between the Fall 2007 semester and the Spring 2014 semester.

Using logistic regression techniques, the selected direct associations tested in this study representing students’ background characteristics (e.g., age, race and ethnicity, gender, HS GPA, receipt of financial aid) were included in various models, along with select college performance indicators (e.g., pass remedial math course, pass remedial English course, pass student success course, & college GPA) in relationship with the likelihood of students’ persistence to future semesters. The results were that the passing of the student success course and the required remedial courses in both math and English along with having a high school GPA of 76 and above improved the odds of persistence into the subsequent semester. When predicting the direct associations with student persistence one year later in college, the passing of the remedial math course, the student success course, and the variable representing having a college GPA of 2.0 and above were found to be statistically significant. In the direct association models, none of the variables representing students’ background characteristics was found to be statistically significant except for high school GPA as a predictor for re-enrollment into the subsequent semester.

In addressing the second research questions, the following interactive variables were introduced: Pass Remedial Math*Pass Student Success Course; Male*Pass Remedial Math Course; Male*Pass Student Success Course; Pass Student Success Course*Non-Traditional Age; HS GPA*College GPA; Non-Traditional Age*Male and HS GPA 76 and above*Received Financial Aid were introduced, in addition to the direct variables included in the models addressing the first research question. The first model continued to find passing the student
success course and passing remedial math course as significant predictors of future persistence into the subsequent semester. The one interactive variable found to be statistically significant as a predictor of students’ persistence was the passing of the remedial math and students success course (e.g., Pass Remedial Math*Pass Student Success Course).

The final model in this study looked at both direct and interactive variables in relation to predicting students’ persistence in college one year after enrolling in the learning community. The significant findings from this model were the passing of the remedial math course at (p=.005) and having a college GPA of 2.0 and above at (p=.006). None of the interactive terms, nor any of the student background characteristics tested was found to be statistically significant in this model.

Similar to the findings of Fike and Fike (2008), students who are able to pass their required remedial coursework are more likely to persist in college. The findings of this study were clear in that students who pass their required coursework, particularly math and the student success course, are more likely to persist to the subsequent semester. Additionally, students who pass the remedial math course and those students with a college GPA of 2.0 and above are most likely to persist one year later after initial enrollment in the learning community.

The most important take away for this researcher is that the demographics of a student were less meaningful compared to college performance indicators in the prediction of future persistence. From an institutional perspective, this should be considered a good result. Regardless of age, race and ethnicity, gender, etc., a student enrolled in the learning community who passes the required remedial coursework, particularly in math and the student success course, is most likely to persist. Although this study did not examine, nor was designed to assess, the effects of the learning community on student persistence itself, the findings of this
study can support practitioners in knowing that the more students can successfully pass the required remediation, the more they will persist in future semesters in college. These results should encourage practitioners to focus on course support strategies in and out of the classroom to engage students, and to encourage students to take advantage of the available resources to be successful in their courses. In the end, students’ being successful is, and should be, considered institutional success.
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