VARIABLES PREDICTING THE RETENTION OF COMMUNITY COLLEGE STUDENTS IN ONLINE COURSES

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Doctor of Education

by

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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

VARIABLES PREDICTING THE RETENTION OF COMMUNITY COLLEGE STUDENTS IN ONLINE COURSES

Presented by Chad Christopher Follis,
a candidate for the degree of Doctor of Education

and hereby certify that, in their opinion, it is worthy of acceptance.

______________________________
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Dr. William Bratberg

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Dr. Sharon Gunn
DEDICATION

I want to dedicate this work to many people that have influenced, supported and encouraged me along the way. Each person is or was important in some stage of life but three girls (or the “grils” as I call them) are the top of the list. My wife, Stacey, has been alongside for both a Master of Science degree and now a Doctorate of Education. Her positive perspective is the perfect balance to my less than positive perspective. She sets an example of professionalism at work, home and community for our girls, Colvin and Sela. Stacey is the key to our family working and without her my success, and that of our girls would certainly be less. She took care of the girls allowing me time to study and work on this research. If her increased workload at the house was not enough she is the best proofreader and spouse I could have expected. Sometimes a person gets the best “future considerations” from a spouse and outkicks their coverage. Stacey will appreciate that sentence.

Colvin and Sela got to have many “girls’ nights”, now hopefully we can have some girls nights that include daddy. The girls will always be a marker in time for this dissertation. Colvin was four (now eight) and Sela was not born (now 3). Both girls are primary reasons for me to accomplish a doctorate degree. I hope to provide them an example of what hard work and determination results in. It is this dad’s dream that Coco and Lala will one day also be MIZZOU MADE. Love you girls.

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Fredericktown, Missouri, to Doctor of Education and two Ag degrees: I DID it!
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Community colleges have seen large increases in students enrolling in online courses nationally. This trend does not appear to be slowing down, in-fact, the number of students enrolling in online courses is increasing. A number of these first generation students come from disadvantaged backgrounds. This study attempted to isolate variables that can best predict a community college student’s chance of successful completion in the online environment.

Ten variables were studied at one community college in Missouri (MOCC) during academic years 2010-2012. The variables were; College division, age, gender, academic semester, academic level, prior remediation, prior online course, grade point average, financial assistance, credit hours enrolled. The study used archived data with 9,540 individual cases. A chi-square analysis was used on the dichotomous and categorical variables and continuous variables were analyzed using an independent t-test. Once significance had been established the variables were analyzed again using a forced entry logistic regression to determine the statistical probability of the variables. All variables except prior remediation showed significance using the three analysis methods. The predictive abilities of logistic regression showed that students with a GPA of 3.0 or higher, enrolled in a Career and Technology field of study, male, receiving financial aid, enrolled in 10.5 credit hours in the summer and an age of 30 were the most likely to successfully complete online courses at MOCC.
Nationally, K12 – Higher Education institutions experienced a large increase in student enrollments during the past decade (Berling, 2010). The enrollment increases were broad based across numerous categories such as gender, socioeconomic and previous educational backgrounds. The most rapid enrollment growth was in the area of online education at community colleges, up 29% (Berling, 2010; CCRC, 2013). The community college increases represent the highest enrollment rates in distance higher education, hosting about half of all online learning in the United States. Lokken (2009) and Bersin (2005) respectively reported, higher education institution enrollment increases in online education courses ranging between 11% and 25% and up to 33% according to Gleason (2004). This accounts for roughly 20% of all students taking courses at American Colleges and Universities (Allen & Seaman, 2008). It is estimated that by 2015, 25 million college students will be taking online courses, up from 1.7 million in 1998 and 3.1 million in 2001 (Nagel, 2011; Miller, 2007). Further, 56% of all degree granting secondary education institutions offered distance courses in the 2001 academic year and by 2003, 34% of the 1000 higher education institutions offered a fully online degree with as many as half of all college degrees also available online (Waits & Lewis, 2003; Allen & Seamon, 2004; Howell, Williams, & Lindsay, 2003). The impact of these online students is that attendance on an actual campus will fall from 14 million to 4 million from 2010 to 2015 and estimates predict that by 2018 more students will be taking courses online than on a traditional campus (Nagel, 2011).
The down side to this influx of enrollment is that student retention rates of online courses are much lower compared to traditional face-to-face courses (Bernard, et al., 2004; Mitchell, 2009; Patterson & McFadden, 2009; Hachey, Wladis & Conway, 2013). Previous research has shown that retention rates in online courses may be 20% lower than courses taught in brick and mortar classrooms with some institutions showing online course drop rates as high as 50% (Aragon & Johnson, 2008; Carr, 2000; MOCC, 2012, Doherty, 2006; Breslin, 2001, Murray, 2001; Diaz, 2002; Lorenzetti, 2002). While these extremes exist in online retention, the Instructional Technology Council reported that they found only an 8% difference between online and traditional classrooms (ITC, 2011). Whatever the actual number, common reasons why students enroll in online courses include course flexibility, wide course options, ability to balance work/life factors, and the perception that online courses are easier to complete (Berling, 2010; Miller, 2007; Park & Choi, 2009). These reasons that online courses are attractive to students are some of the same reasons online courses are attractive to Universities, coupled with increasing technology to perpetuate online courses (Brown, 2012). Many factors contribute to the low retention rates among online courses. Interestingly, some of the same reasons that students prefer online courses are the factors responsible for the low retention rates.

The methods to increase retention rates are as diverse as the students served in online courses. Multiple factors influence retention rates ranging from social responsibilities, family influence, employment, traditional/non-traditional student demographics, academic preparedness and student behavior (Astin, 1993; Tinto, 1993, 2006; Miller 2007; Park & Choi 2009; Nickel, 2010). The larger issues of retention are
complicated since the factors for student drop out are not static elements, but changing and evolving along with online education and student’s life circumstances (Tinto, 2006).

A crossroad is developing between higher enrollment and course completion rates. Retention of online students also must increase and political leaders are calling for more citizens to obtain some level of higher education. In some American school districts, legislatures are calling for academic funding to be directly proportional to graduation rates and other classroom variables. In Australia, attrition rates for bachelor degree seeking students are already a performance indicator used to determine funding levels (Willcoxson & Wynder, 2010). These key issues are placing more pressure on colleges and universities to study retention, in relationship to college inputs and outputs, and implement programs to keep students enrolled and matriculating toward a degree. In Missouri, for example, Governor Jay Nixon (2010) has set a target of increasing college degrees from 38% to 60% by the year 2025.

President Barack Obama (2009) first announced the 60% threshold to a Joint Session of Congress as a United States educational objective (Hachey, Wladis & Conway, 2014). Governor Nixon has laid out a strategy in Missouri to reach the Big Goal of 60% objective that includes one-year Associates and three-year Bachelors degree programs, increasing dual credit & dual enrollment in high schools, reverse transfer from universities to community colleges and most notably state-wide online degree offerings (Nixon, 2010; Missouri Department of Higher Education, 2013). This is important since estimates say 60% of all jobs in Missouri will require education ranging from certificates to advanced degrees (Missouri Department of Higher Education, 2013). Currently, the
Governor is advertising in print, television and online for enrollment in Western Governors University, a for-profit distance learning institution (personal observation, 2013). Online courses play a role in reaching these lofty politically driven educational goals.

Community colleges serve a wide and ever changing student population. Students range from the traditional, direct from high school learners, to non-traditional adult learners attending college for the first or multiple times. The open-door policy at community colleges has historically offered education to parts of the local population that are underserved educationally such as women and minorities (Stahl & Pavel, 1992, Shannon & Smith, 2006). Community colleges also serve a large portion of students that require some type of remediation coursework with reports at MOCC suggesting upwards of 50% of all students in attendance need remediation (D. Jaycox, personal communication, 2012). The open door policy, while advantageous to getting students in the door to college, allows students to register for online courses without any determination about their chances of success (Muse, 2003). Students that begin with educational roadblocks need an institution that adequately advises them and aid in determining if online courses are right for the student in the beginning.

In Missouri, only 8% of the adult population has attained an Associate’s Degree (Lumina Foundation, 2012). This is an area that will require dramatic improvement if the proposed 60% degree attainment threshold is to be reached. While community colleges enroll large numbers of adults and non-traditional students, they see dramatic losses in students before degree completion. Online courses appear to be the great equalizer for
educational access, allowing community colleges to increase access to underserved and adult populations in flexible and unique ways, as well as speed the pace of student remediation. On the surface, this seems logical but, as noted earlier, nearly half of all students that enroll in online courses drop them prior to successful completion. Online courses require a paradigm shift in the minds of students. Students must accept that the instructor is guiding and facilitating the work not teaching them as most are accustomed in a secondary education setting. This learning approach is the foundation of the learning theory Androgogy (Knowles, 1998). Given the student population diversity and potential limited educational preparedness, where do online courses at community colleges fit into the goal of 60% of the population achieving a higher education degree? In his 2006 paper, Tinto was quoted as saying “retention matters now more than ever” (p. 5) and he could not have been more correct, because it will take 280,000 more college degrees awarded every year between now and 2025 to reach the 60% goal (Lumina, 2010).

**Statement of Problem**

Higher education institutions need to share the burden of addressing retention in all courses, but with the popularity of online education exploding and retention rates decreasing for online courses, something must be done (Allen & Seamon, 2007, 2008). When this issue is viewed through the political lens, the policies from legislatures further complicate the problem with a machine-like bureaucracy mentality. Politicians want quantitative results for tax dollars spent, while colleges are trying to retain students as retention rates continue to slip lower. In states such as Indiana, Oklahoma, Kentucky and
Wisconsin politicians have passed legislation encouraging attendance and therefore retention at community colleges. Community colleges have also been the focus for President Barak Obama as he called for five million additional graduates in the American Graduation Initiative (Hirschy, et. al., 2011; Obama, 2009). The key to these initiatives is retention which Education Secretary Arne Duncan stated “we’ve done a decent job of getting students in, but a poor job of getting them out with a degree in hand (p. 2).” President Obama called college completion the “economic issue of our times” and vowed that “America will once again lead the world in college graduation rates by the end of the decade” (Jenkins, 2012, p. 2). Colleges have been focusing on the wrong things, recruiting students, allocating resources and people to get students in but have done a poor job of keeping the students they get. The economic reality is, it’s cheaper to retain a student than recruit a new one (Astin, 1993; Pascarella & Terenzini; 1991; Tinto, 1993). The concern is that many states are intending to increase graduates by recruitment and stressing online courses, which might be counterproductive since retention rates are low compared to traditional courses. This is numerically described by the fact that Associate’s Degrees have only increased by 3% while enrollment at community colleges fell by 3.1% (Marcus, 2013).

The question of retention is difficult to answer with so many factors that can impact student completion. Student’s motivation, GPA, college readiness and a degree plan all play important factors in course completion. These variables are often called student attributes in previous research studies (Doherty, 2006). Contradictory data regarding gender, communication skills, and age play varying roles in student success or
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failure (Doherty, 2006). The institution is vital to student success by having engaged, knowledgeable instructors in online courses along with keeping up-to-date technology (Jaycox, 2012, personal communication; Tinto 2006). “Institutional support is important”, says Mineral Area College Learning Management System Director Dan Jaycox, “How much should the student be regulated in course design compared to the institution meeting the student where they are” (D. Jaycox, personal communication, 2012)? These course attributes have been cited as slightly negative factors to success in the online environment according to Muse (2003). Mr. Jaycox elaborated that in his experience “students view technology resources as the institution’s responsibility to maintain and keep students up-to-date with the most recent technology trends and resources” (D. Jaycox, personal communication, 2012). The qualitative results of Muse’s (2003) study show that successful students integrate available technology resources early in the course which reduces their frustration leading to drop out. External factors can easily impact student completion in a negative fashion (Miller, 2007; Park & Choi, 2009). The technology itself has come under question about how online course themselves impact learning. Technology is an area of mixed results, but most agree that no significant difference in final learning outcomes exist between distance and traditional models (Russell, 1996; Clark, 1994). If learning is equal then the emphasis of understanding student specific variables is only increased since Maxwell, et. al., (2003) stated “community colleges lack knowledge of who is enrolling in online courses”.

The expectations from outside stakeholders (politicians, businesses, community leaders) are pressuring administrators to understand the reasons for low retention rates in
online courses. As online courses continue to increase in popularity it is imperative that educators determine how, why and what methods are necessary to increase online student retention. Retention is especially important at community colleges that enroll large numbers of adult, non-traditional learners that often begin college with limitations before they start their first class. If colleges determine methods for increasing online retention rates, they could positively increase the number of citizens with college degrees. The first place this impact would be felt would be better advisement to students, directing those with increased chances of success into online courses and those with reduced chances of success away from online courses. This step alone should impact retention rates in a positive fashion. The question is who is successful in an online course at a community college?

**Purpose of Study**

The purpose of this quantitative archival data analysis study is to test the empirical relationship between 11 variables (10 independent and one dependent) which are believed to relate to successful completion of online college courses at Missouri Community College (MOCC).

Previous studies have explored student attrition focusing on singular variables at a time (Doherty, 2006; Willcoxson & Wynder, 2010, Tinto, 1975, Bean & Metzger, 1985). This study attempts to isolate how multiple variables relate to student success in the online learning environment specifically at one community college in rural Missouri. Previous studies have shown mixed results when trying to isolate the predominated
singular variable to success in the online environment. This study will add to the research by attempting to determine a numeric outline of a successful student enrolled in online classes at a rural Missouri community college. The study will also add to the literature available where according to Muse (2003) “empirical studies of community college students and courses are scarce (p. 242).” Nora & Plazas Snyder (2008) agree that community colleges are an area of limited research focusing on performance indicators such as grade point average and course completion among others.

**Research Questions**

The research questions guiding this study are:

1. How do student level factors relate to successful online course completion?
   a. $H_{01a}$ College division is not related to successful online course completion
   b. $H_{01b}$ Academic level is not related to successful online course completion.
   c. $H_{01c}$ Academic semester is not related to successful online course completion.
   d. $H_{01d}$ Prior enrollment in remediation course(s) is not related to successful online course completion.
   e. $H_{01e}$ Prior enrollment in an online course is not related to successful online course completion.
f. $H_{01f}$ Student gender is not related to successful online course completion.

g. $H_{01g}$ Student financial assistance is not related to successful online course completion.

h. $H_{01h}$ There is no significant difference in the number of credit hours taken between those successfully completing an online course and those that do not.

i. $H_{01i}$ There is no significant difference in the grade point average between those successfully completing an online course and those that do not.

j. $H_{01j}$ There is no significant different in student age between those successfully completing an online course and those that do not.

2. How do the student level factors predict successful online course completion?

a. $H_{02}$ There are no significant linear relationships that explain the variance between student level factors and successful online course completion.

b. $H_{a2}$ There are significant linear relationships that explain the variance between student level factors and successful online course completion.

**Conceptual Underpinnings for the Study**

Online learning is a dynamic and changing area of educational instruction. Given this environment, it is necessary to view distance education through a wide lens initially.
The Constructivism Learning Theoretical frame will be the lens used to view the study. The Constructivism theory allows for a complete review of literature and sifting of useful data. Constructivism Learning Theory is a naturally wide area that will focus toward the area of student engagement.

Constructivism proposes the idea that learners will create their own reality by active learning and prior experiences to increase knowledge. Researchers such as Dewey (1938), Piaget (1973), Vygotsky (1978), and Bruner (1996) all took slight variations of this definition of constructivism. Dewey (1938) believed that the environment forced active experimental learning on the student. This allows for a problem solving approach to learning by opening the ideas of free discovery to the student. This approach works well for adult learners who must solve problems in the “real world”, which they can bring into the online environment. Educators then have the opportunity to customize lessons and discussion toward student learning needs on a real time basis.

Knowles (1998) learning theory is called Androgogy. It states that adult learners will take a more active and motivated role in learning once they understand the learning method available. Past experience will influence learning in a step wise progression toward problem solving. The educator is acting as a facilitator to learning, providing opportunities for knowledge, not directing the learning in a traditional classroom lecture format. Using past knowledge and integrating this knowledge into the classroom was seen as an important conclusion according to (Muse, 2003) when he stated “adult online students would quickly asses a learning situation and take action if the situation is less than ideal.”
Vygotsky (1978) emphasized the interaction between students and instructors on cognitive learning. Social constructivism theory is based on a deep socially collaborative problem solving strategy among students. Based on Vygotsky’s view of constructivism increasing the interaction between students and engagement in coursework increases overall learning. Engaging students online happens in various forms but parallels the idea of Dewey (1938) that the instructor is less of a leader in learning, instead mingling with students in virtual learning communities. The greater the amount of engagement, the more retention is witnessed in the online environment according to Park & Choi (2009). Each step in constructivism theory circles around student engagement which can be related to increased retention in the online classroom.

**Design**

This quantitative study will analyze archived data from students (n=9,540) enrolled in an online course(s) at MOCC. Students were able to enroll in roughly 130 online courses between academic years 2010 – 2012. Students enrolled in each course on their own will without interference from the study researcher. The purpose of the study is to determine an outline of a successful online student. If a student successfully completes multiple online courses the statistical potential to reinforce the hypothesis of the study is validated. Equally important, if a student takes and unsuccessfully completes multiple online courses then that student’s outline will reinforce the predictor variables that trend toward unsuccessful completion. Courses covered in this study will not be differentiated as being mandatory, elective or remediation in nature for overall degree completion. The
study objective is to add to the knowledge of what possible predictor variables make for a successful online education student. Unsuccessful completion of the course will be defined as the letter grade of F or drop/withdraw. Successful completion will be completing the course with a letter grade of D or higher, which follows the work of Berling (2010); Doherty (2006) and Muse (2003). Students auditing a course(s) were not considered for this study. Pass fail courses were also not included in analyzed data.

To obtain this data, a request will be made to the MOCC Instructional Technology (IT) department to query the academic servers for the desired variables. Permission has been granted by the College President of MOCC to use necessary data and access to campus resources. Data will be provided in a de-identified manner to the researcher.

Methods

The data will be analyzed using chi-square to analyze the categorical and dichotomous variables. An independent t-test will be used on the continuous variables. Once significance of the 10 independent variables was determined a logistic regression analysis will be used to determine which variables had the strongest probability of predicting successful completion in on-line courses at MOCC. Logistic regression analysis will be used to determine if a categorical outcome variable (dependent variable) illustrates predictive differences between 10 independent predictor variables. The 10 independent variables are categorical, dichotomous and continuous. This statistical measurement was partially chosen due to the ability of logistic regression to predict which of two categories a variable will fall into given the collected data (Field, 2009).
Additional reasoning for using logistic regressions is based on the ability of logistic regression analysis to determine future predictions, without using variables that contain linear relationships like those necessary for a linear or multiple regression analysis. Retention research has also shown that when a single dichotomous dependent variable, like the one used in this study, logistic regression is the most appropriate statistical approach (Porter, 1991; Willett & Singer, 1991).

The study equation will be:

\[
P(Y) = \frac{1}{1 + e^{-(b_0 + b_1X_1 + b_2X_2 + \ldots + b_nX_n)}}
\]

(Field, 2009)

**Assumptions**

This study only covered undergraduate online courses at one community college in Missouri. Online courses were taught at freshmen and sophomore college levels numbered 0095-2999. There was no delineation between courses that were required for particular degree completion or elective credit. Additionally, remediation courses were not delineated from non-remediation courses. Average drop rates for courses were also not considered. This study did not attempt to correlate positive completion in the online learning environment with degree completion nor future success in higher education. This study was done using quantitative research methods only with data harvest from archival data. Using quantitative data did not allow for student personality, learning style or opinion toward the instructor as factors.

This study did not consider instructional design, faculty expertise or experience. Course interaction between student and instructor was also not a factor in data analysis.
Additionally, special accommodations for underserved educational population’s access to online courses at MOCC were also not considered.

Data will be harvested by request of the study author from the MOCC Instructional Technology department. Personal information was not requested such as but not limited to: student name, student number, student social security number, online course instructor name, employee number or course section number. The objective is to eliminate any potential for the study author to match study variables with a particular student or instructor on the MOCC campus. Eliminating identities of students will maintain the potential that the study population is representative of all community colleges. This should increase the ability of this study design and methods to be repeatable to other similar facilities. With the instructor blinded to the identities of the participants the potential for external errors will also be reduced.

**Definition of Key Terms**

The following are definitions that were used throughout this study:

**Academic Year.** Defined as online course(s) offered at MOCC beginning in August 2010 and ending July 2012 covering fall, spring and summer semesters. The first semester reported was fall 2010; the last was summer 2012, covering 6 academic semesters.

**Distance Learning.** Defined as fully online courses at MOCC delivered entirely over the internet during academic years 2010-2012. Courses outside of internet based delivery such as ITV, hybrid, correspondence or telecourses were not considered in this
study. Online learning, distance education, online environment, online courses were used synonymously to describe distance learning in this study (Henson, 2013, Bertling, 2010, Keegan, 2002).

**Non-traditional Student.** Defined as students enrolled in college who have population characteristics not normally associated with students to higher education. Non-traditional students come from social classes, ethnic groups or age groups that are historically underrepresented (Henson, 2013, U.S. Dept of Education, 2011, Choy, 2002, MOCC, 2012, 13, Bean & Metzger, 1985).

**Successful Course Completion.** Defined as a student receiving a passing grade of D or higher in the online course(s). Students receiving a grade of F or I was considered unsuccessful completion. Course completion was used synonymously with retention, persistence, and successful completion (Bertling, 2010, MOCC, 2012, p. 45, Doherty, 2006; Wojciechowski & Palmer, 2005, Argon & Johnson, 2008).

**Traditional Learning.** Defined as in person where instructor meets the students in the classroom where instruction and learning take place. Traditional classroom, standard classroom were used synonymously to describe traditional learning in this study (Henson, 2013).

**Traditional Student.** Defined as an individual enrolled in online courses at MOCC during academic years 2010-2012. The individual is typically under the age of 24, financially dependent and continually takes courses in consecutive order. Student
was used synonymously with participant, online student (Henson, 2013, U.S. Dept of

**Unsuccessful Completion.** Defined as a student that did not complete the online
course with a passing grade of D or higher. Students that withdrew from the course
(prior to receiving a grade) or were dropped by the instructor (prior to receiving a grade)
were considered as having not completed the online course. Additionally, students that
initially received a grade of Incomplete (I) were also considered as non-completers
(Bertling, 2010; MOCC, 2012, p. 45; Argon & Johnson, 2008). Non-completer and non-
completion were used synonymously to describe unsuccessful completion in this study.

**Significance of the Study**

As the numbers of students continue to rise across the nation academic institutions
need to have a clearer picture about the type of student that is successful in online
coursework. Previous research has shown that community colleges offer a
disproportionate number of college credit hours in the United States. An overwhelmingly
high percentage of enrolled students are between the ages of 25-54. This means that
community colleges are perfectly situated to address the lower retention rates in online
courses compared to traditional course, but adult learners are often not able to pursue a
degree using traditional methodologies, instead benefiting from the flexibility that online
education offers. The purpose of this study is to determine if a relationship exists
between 11 variables that could result in a student outline capable of situating students in
online courses. This information will expand what is known about student readiness for
online courses. It will give MOCC a new set of tools to adjust policy to positively impact student learning. By determining a baseline set of success variables, campus administrators and instructors can begin to alter online education to serve a changing student demographic, while reducing dropouts. If online course retention rates are increased the potential to increase college degree completion is obvious. Increasing degree completion raises the number of citizens with college degrees moving society toward the 60% policy goals outlined by political policy makers.

**Summary**

The purpose of this study is to expand the knowledge regarding 10 independent predictor variables and one dependent variable for successful completion in fully online courses at MOCC. Studies have been done in the past using similar variables. Where this study differs is it focuses on multiple demographic variables at community colleges that historically serve a disproportionate number of non-traditional and underserved learners.
CHAPTER TWO: LITERATURE REVIEW

Introduction

Chapter Two will review the predominant retention theories then move to a
discussion of the individual study variables looking at how past research relates to online
retention. First, a brief historical perspective related to distance education and the
explosive growth of this educational medium will be reviewed. The literature review is
divided into multiple sections as a way to give a complete picture of factors effecting
online learning. The historical review of adult learning theory focuses on the most
prominent theorists and will start the literature review. The objective is to give the reader
a grounded understanding that will lead the entire research project.

The remaining paragraphs will combine variables into sub-sections that share
similar connections to online learning students. Each variable will be discussed
individually and in conjunction to the other sub-section variables. The unique design of
this literature review is due to the fact that previous studies have explored student
attrition focusing on singular variables at a time and often show that a student’s
motivation impact retention (Doherty, 2006; Willcoxson & Wynder, 2010, Tinto, 1975,
Bean & Metzger, 1985). Some studies have focused on 3-5 variables but few studies
have focused on numerous variables related to online retention especially when focusing
on community colleges (Cabrera, et. al., 1993; Camara, 2003; Pascarella & Terenzini,
2005; Berling, 2010). This study attempts to isolate how multiple variables relate to
student success in the online learning environment specifically at one community college.
in rural Missouri. Previous studies have shown mixed results when trying to isolate the predominated singular variable or variables to success in the online environment. This study will add to the research by attempting to determine an outline of a successful student enrolled in online classes at a rural Missouri community college. The study will also add to the literature available where according to Muse (2003) “empirical studies of community college students and courses are scarce (p. 242).”

Distance education has been a part of American education since America was only a collection of colonies in the early 1700s and continued with steady growth through the 1800’s (Harting and Erthal, 2005; Parker, 1999). The next incarnation of distance learning was prompted by the federal government with the creation of Land Grant Institutions in 1862. The purpose of the regional research Universities was teaching home economics and agriculture to the masses following the Hatch Act (1887) and the Smith-Lever Act (1914) (University of Missouri Extension, 2014). As the country modernized so did the distance education model. In the past, radios, television and now computers and smartphones and tablets allow for college course credits to be obtained. By 1990, 30% of all adult students were receiving some distance education and between 1994 – 1998 cyber schools had increased from 63 to 800 (Cook, 1997; Gubernick & Ebling, 1997). Currently, entire higher education industries exist with the purpose of educating students while at the same time making a profit. The Apollo Group which owns the University of Phoenix is now the country’s largest education provider. The University of Phoenix is not alone in the distance education endeavor. Western Governors University, Capella, and Kaplan are a few more examples of how distance
education is expanding. One advantage of for-profit institutions is the increased access to education for the historically educationally disadvantaged.

The purpose of this quantitative archival data analysis study is to test the empirical relationship between 11 variables (10 independent and 1 dependent) which are believed to relate to successful completion of online college courses at Missouri Community College (MOCC).

The research questions guiding this study are:

1. How do student level factors relate to successful online course completion?
   a. $H_{01a}$ College division is not related to successful online course completion
   b. $H_{01b}$ Academic level is not related to successful online course completion.
   c. $H_{01c}$ Academic semester is not related to successful online course completion.
   d. $H_{01d}$ Prior enrollment in remediation course(s) is not related to successful online course completion.
   e. $H_{01e}$ Prior enrollment in an online course is not related to successful online course completion.
   f. $H_{01f}$ Student gender is not related to successful online course completion.
   g. $H_{01g}$ Student financial assistance is not related to successful online course completion.
h. $H_{0lh}$ There is no significant difference in the number of credit hours taken between those successful completing an online course and those that do not.

i. $H_{0li}$ There is no significant difference in the grade point average between those successfully completing an online course and those that do not.

j. $H_{0lj}$ There is no significant difference in student age between those successfully completing an online course and those that do not.

2. How do the student level factors predict successful online course completion?

a. $H_{02}$ There are no significant linear relationships that explain the variance between student level factors and successful online course completion.

b. $H_{a2}$ There are significant linear relationships that explain the variance between student level factors and successful online course completion.

Whatever the educational model, retention numbers appear to be stagnant to decreasing with few rare exceptions. In a study by the Educational Trust titled Subprime Opportunity the report stated that University of Phoenix first time, full-time Bachelors Degree seeking students enrolled in online courses only had a completion rate of 5% (Lumina, 2010). The contrasting result was for community colleges where the Subprime Opportunity found that 60% of community college students at for-profit institutions completed compared to 22% for non-profit institutions (Lumina, 2010). In Missouri the completion rate of all community colleges was 20.7% for non-profit schools and 65% for
the for-profit 2 year colleges (College Completion, 2004). These numbers represent all courses but follow a similar downward trend line with respect to online retention as discussed earlier in Chapter 1.

**Historical Retention Theories**

Tinto (1975, 1993) first began his work on retention in 1975 with updates in 1987 and again in 1993 which has many links to this study. Since it was first published his works have become the most widely cited retention model in higher education (Berling, 2010). Tinto believed that the more a student was integrated into the institution the more likely they are to persist. To begin the theory Tinto assumed that each student has certain set of individual pre-entry variables that will factor into the decisions to stay or leave. These variables include gender, financial status, family support and background and the student personal commitment to degree completion. Each of the students’ pre-entry variables can influence decision making related to retention and ultimately degree completion. Once a student is enrolled into campus courses they are not part of the campus community. How well they integrate and find support is central to Tinto’s model.

Students need to be integrated both academically, socially or both into the campus community with this relationship occurring within campus sub-groups or within the larger campus framework. Neither academic nor social integration appears to hold a higher benefit than the other, but the integration shows the students willingness or ability to persist. What is important about student integration is that it helps to transition student
through the three rites of passage with are 1) separation from known norms and cultures, 2) transition to the new norms and cultures and 3) integration and adaptation of the new norms and cultures.

The movement from one step to another through the rites of passage is the typical movement successful students take on their way to degree completion. Students who do not persist typically fall under the category of voluntary departure which is where Tinto focused his research. Voluntary departure has two roots: intention and commitment. Intentions and changes can be influenced by student variables or reason not known to the student. The other root, commitment, can be a commitment to the campus or to a personal goal such as a career objective. Tinto reported that the more committed a student was to a career goal the more likely they were to complete the degree. This was true of all academically prepared students but was also true of the less academically prepared coming into college. This is an important factor for many students coming into community colleges that as reported earlier tend to be older and less academically prepared. This also highlights the primary disagreement with Tinto’s model; it does not factor in non-traditional and distance education students.

Astin (1984, 1993) has updated his Student Involvement Theory several times but the core focus is the same, the quantity and quality of energy students invest in college. Astin believed that the more energy a student devoted to involvement in academic and social situations the more involved the student is in college. The theory posits that this involvement will lead to greater personal development and student learning. The student is central to the process in this model as they invest more energy the outcomes should be
more positive whereas a student with low effort will correspondingly have lower positive outcomes. As a past psychologist Astin was influenced by the motivation construct from psychology. Motivation influenced the involvement portion of the theory to allow educational practitioners to better integrate the model in a learning environment. This influence allowed the Student Involvement Model to focus on behavioral process as opposed to developmental outcomes.

The theory was broken down into three major components, they are, inputs, environment and outcomes. The characteristics are often written as I-E-O. The inputs are centered on demographics, background, preparedness (called student characteristics in this study) that influences student decisions at the time of college entry. Environment refers to all the things a student experiences and interacts with while in college. Examples are policies, clubs, classes, faculty members, educational experiences, roommates; almost any item the student interacts with could influence decisions about campus perceptions. Outcomes refer to the learning characteristics after the exposure to the environment such as posttest scores, GPA, course outcomes and degree completion. Further broken down from the I-E-O model were the five postulates of involvement:

1) Investment in physical and psychological energy
2) Involvement is continuous
3) Involvement has both qualitative and quantitative features
4) Development is proportional to quality and quantity of involvement
5) Educational effectiveness is related to the increase in involvement
The Student Involvement Theory can be used in the natural setting to observe students actively involved in college learning. Similar to Tinto and Bean’s original work, Astin did not focus on non-traditional students specifically which could lead to more difficulty in explaining their impact on college and the colleges impact on them and therefore their retention. The two following theories began to include the changing educational dynamics.

In early works Bean (1980), and Bean & Metzner (1985) suggested that students exhibit certain characteristics that impact their persistence by understanding their perceptions and integration within the campus. The student views the campus from differing frames of reference that each impact the student’s decisions to persist. The student will evaluate GPA, student events such as clubs, athletics and other more important factors such as value of education and institutional quality. These variables should increase the student satisfaction with the institution thereby increasing the satisfaction with leads to integration and finally persistence.

In 1985 Bean along with Metzner revised the model determining that student socialization is mainly up to the individual student. Additionally, the revised model made the point that retention models were assuming that students in college were all traditionally aged. This is an important step in retention understanding since many non-traditional students will not or are not able to join student clubs for example to become part of the campus community. The non-traditional student is not only older but also tends to live off campus, attend part-time and often attending to improve work related skills.
With this new definition of what a post-secondary student was Bean and Metzner produced four variables they believe had the most impact on a student’s lack of retention, 1. Prior academic performance in high schools other college course; 2. Intent to leave related to goal commitment, program meeting learning needs; 3. Background and defining goals; 4. Environmental goals such as hours worked, finances, family support. Each of these variables clearly impacts non-traditional in different ways than traditional students. This is why Bean and Metzner began to unravel the idea the singular variables are not good predictors and that multiple integrated variables are important to understand as they relate to traditional and non-traditional students.

Kember (1989) began his work by basing it on the work of Tinto. The difference was that Kember emphasized that non-traditional students are older, do not live on campus, enroll part-time and have different goal objectives. These characteristics also describe online students. One of the primary factors for Kember was that non-traditional students are often years removed from academic measures such as high school and current GPA’s. In his opinion there “is unlikely to be a direct causal link” (Kember, 1989, p. 287) between non-traditional students success in online courses and previous educational situations. Instead the idea of goal commitment and motivation became more important variables in his work. Some students are interested in the degree plan, (e.g. intrinsic motivation, and others are motivated by career goals, (e.g. extrinsic motivation). The greater the career outcome goal the more extrinsic motivation the student has.

Tinto focused on integration on the campus culture while Kember reported that students can become integrated from other areas. This is certainly true of non-traditional
students and those enrolled in distance education. These students can find motivation and integration from family members or their existing career. The more supportive the employer is the greater the goal commitment and integration. This leads to what was described as a “recycling loop” (p. 295) where students, especially non-traditionals, must determine if the degree is worth the time away from work, family and personal time. This hints at the importance of online courses focusing on educational needs of enrolled students, importantly those that are only taking a few courses to improve job skills and never intend to obtain a degree.

**Academic Variables**

**Arts & Sciences (AS) / Career & Tech (CT)**

Students who self-select online courses tend to perform better when compared to students that do not self-select into online courses. (Pascarella & Terenzini, 2005). The self selection information is important since an increase in online courses required for degree completion is rapidly increasing up from only 20% in 2006 (Allen & Seamon, 2007; Dobbs, Waid, Del Carmen, 2009). Overall it appears retention rates improve when students take at least one online course during a degree program, this is thought to relate to increased flexibility and possibly increased efficacy with the online learning platform (Aslanian, 2001; Fike and Fike 2008).

Retention is commonly broken down into two categories that relate to student completion; in-college and external factors (Astin, 1993; Pascarella & Terenzini, 2005;
Tinto, 1993, 2006). One of the in-college factors that have been researched is academic major with varying results related to successful course completion. One of the ideas about academic major is the idea that an academic or professional goal will add motivation toward successful completion. Goal commitment, such as the desire to reach a self-determined career goal, is a strong motivator for persistence (Tito, 1993). The idea that a career goal could increase student retention works from the angle of human capital theory which focuses on return on educational investment. The student may believe that a college degree is worth the effort due to future job prospects or upward social mobility from their current industry. This was evidenced by Berling (2010) who found that health and human services and STEM students performed better than non-career and tech and non-STEM degrees relative to degree completion. These students also tended to be older, seniors, female and have a higher GPA compared to other study participants. The health and human services students were also significantly more likely to be in a fully online degree program (Berling, 2010). This information agrees with the idea that degree plans with an online component aid students toward successful degree program completion.

The Berling study is contrasted by Lu, Yu and Liu (2002) who found that academic major did not show an increase in successful course completion in their empirical study of 96 business major graduate students.

Degree choices no doubt have some impact on overall student retention. In a 2005 study published in the Journal of Dental Hygiene, 76% of students who left the program reportedly did so due to “dissatisfaction with career choice” (Holt, 2005). In a study comparing general Bachelors of Business students to a career business degree like
Accounting it was shown that the Accounting students had more clearly defined career goals and aspirations. This resulted in a significant correlation between career goals and college course retention (Willcoxson & Wynder, 2010). The inability of a student to properly identify a career that matches their interest has been shown to increase dropout. In two separate studies researchers found that the choice of the wrong career field had the greatest impact on retention (Yorke, 2000; Christie, et. al., 2004). A third similar study found that 22% of the students that made a change to their originally declared career plan ended up dropping out after only one year in college (Long, et. al., 2006). Retention is increased when a student has ‘major certainty’ as Bean called it in his 1980 definitive retention work. The more confident a student is in their ability to correctly choose a career field that fits them the more likely they are to stay enrolled (Sandler, 2000). This early recognition of career goals and retention was further corroborated by Kreysa (2006) who found increasing retention, up to 22% more, for students declaring a major at the outset of their education. It appears that the student’s ability to choose the appropriate career for them was more important to long term retention than other academic variables (Willcoxson & Wynder, 2010; Allen & Robbins, 2008).

The relevance of the course material is important to retention in the online environment according to Park and Choi (2009). Their study was in agreement with Levy (2007) and Doo & Kim (2000) who all found that as the student satisfaction with the online course materials and perceived relevance to their future career and current occupation increased so too did the persistence of the student toward successful completion. Online learners can easily lose focus and begin to procrastinate in the virtual
environment. That is why active learning and course content is vital to retention; especially for non-traditional and career and technology based students who tend to be older, female, minorities, married, first generation college students, receive financial aid, work full time, identify themselves as employee who studies, maintain a higher GPA and took a vocational program in high school (Hirschy, Bremer, Castellano, 2011). With 2,000 2-year institutions offering post-secondary careers based education and 64% of students seeking an Associate’s Degree studying career and technology fields it is important to understand the dynamic career integration plays in the online environment (Levesque, et al., 2008, Phelps, 1996).

The learning community has been a focus of degree completion. It has been found that degree programs that offer a community approach to learning have higher completion outcomes. Cohort learning models build a sense of community that evolves over time bonding students slowly according to Conrad (2005). The increased support created a collaborative culture that encouraged persistence. Many degrees in the career and technology areas are built in a workforce model possibly accounting for some community building that translates into retention. Career driven programs also tend to reduce the number of elective courses a student is eligible to take. This is a contrast with more generic degrees where much of the course work is taken by the student due to course availability and requirement. Students in a career pathway typically take most of their courses in a degree area they have a motivation to perform well in due to the career goals they have set earlier. In contrast generic programs take more courses of their choosing but many may not relate directly to their personal career goals. The outcome is
that students in career and technology fields that have stated clear career pathways that match their perceived skills, like the nursing, STEM and accounting students mentioned earlier, tend to exhibit an increased retention when compared to students in generic degree programs. Completion of an associate’s degree can be vital to the long-term earning power of career and technology students. A study from Georgetown University found that 30% of 2 year career graduates make more than bachelor’s degree graduates (Marcus, 2013). In two states, Tennessee and Virginia, the salary increase can be as high as $2,500. This is reinforced with news that an estimated 29 million American jobs only require an associate’s degree, but only 10% of United States works have a specialized associate’s degree (Marcus, 2013). As more students of all ages turn to online courses in becomes clear than the degree programs they choose and the relevance these courses have to job skills is increasing the need to understand retention variables.

Career goals and relevance appear to be an important factor in college retention due to long-term motivation. This was evidenced by Anna Spalding who had the following observation as an adult learner at Tyler Texas Junior College; “contrary to those who say older students are more likely to drop courses….Ms. Spalding says she has observed that students in their teens and 20’s are more at risk, while older student with better-defined career goals have an easier time dealing with independent nature of the work” (Carr, 2000). Motivation has been shown to improve a student’s self-regulation but the desire to push active learning could be at the student’s determent if they are unprepared for this advance learning style. One group that could be at risk are freshmen
and those students in their first semester of college with low numbers of completed credit hours.

**Academic Level; Academic Semester; Credit Hours in Semester and Grade Point Average**

Academic level, academic semester, credit hours in a semester and Grade Point Average (GPA) will be discussed together due to the deep relationship they have to one another. First semester freshmen have obviously attained few credit hours and are entering their first fall semester while seniors (or sophomores in community colleges) have more earned credit hours, higher grade point averages and developed study skills with an intrinsic motivation to finish coursework toward their degree. Studies have isolated these variables or limited combinations of variables in the past, just as this study is attempting to do, but a clear relationship exists between these independent variables (Parker, 1999). This integration of variables will be outlined in more detail below.

One of the consistent variables studied relating to retention is a student’s return to college following their freshmen year. Understanding how freshmen are retained and what variables impact personal persistence is important since two-thirds of first time freshmen attend community colleges (Hachey, Wladis & Conway, 2012). This is important since most students decide to drop a course before the completion of the third class with most traditional students not returning to college after their freshmen year (Bauman, 2002; Reason, 2003). Returning after the freshmen year is viewed as a positive sign toward degree completion. In a study by Fike and Fike (2008) they found that one-
third of fall semester freshmen students did not enroll in the same institution the following spring. Comparing fall to fall enrollment in the same study showed a 50% reduction in first time freshmen students enrolling in the same institution the following fall. Lederman (2009) reported that 2007-2008 freshman to sophomore retention rates sank to their lowest point in 25 years. The Rochester Institute of Technology found that 50% of freshmen who left during or after their first academic year had common variables of; low GPAs and low ratios of credit hours attempted. They also found that freshmen year GPA and degree progress were the most reliable factors in predicting student persistence. Nationally, statistics indicate a similar percentage of loss with average retention rates of approximately 41% from first (freshmen) to second (sophomore) year and a 34% degree completion rate (Harnish, 2005; ACT, 2007). These previously reported statistics illustrate the importance for higher education to determine predictor variables of student retention.

Many factors influence student retention but the more socially and academically integrated a student is early, the greater the long term persistence (Karp, Hughes & O’Gara, 2008). The more concrete factors such as GPA, financial cost/need, full-time status also play a role in student retention from freshmen to sophomore year according to Nora, Barlow & Crisp, (2005). Long term career goals also play a role in student retention as previously discussed but is reinforced in an Australian study that found first semester students with clear major certainty performed better than students in other academic levels with reduced career clarity (Willcoxson & Wynder, 2010).
When looking specifically at online retention related to academic level Dupin-Bryant, (2004) and Maki and Maki, (2003) were able to correlate a statistically significant relationship between computer experience and academic level compared to retention. Both studies essentially found that higher academic level students (those with more credit hours earned) with more computer skills tended to persist in online courses at a greater level. Additional research found that students in higher academic levels earned higher grades supporting previous research, but interestingly, also found second semester freshmen had lower retention rates than first semester freshmen (Henson, 2013). It was theorized that freshmen students focus on individual courses early in their academic careers and less about long term graduation which could explain some of the retention differences between semesters. Two other theories have been put forward about why freshmen are retained less in online courses and the first is they lack the self-directed learning skills necessary in higher education and certainly in the online environment (Canada, 2000, Allen & Seamon, 2008; Boyles, 2000). It takes time to master the self-directed learning skills necessary and freshmen are just learning these skills. The second theory is that many freshmen coming into online courses are seen as ‘digital natives’ by their advisors and instructors (Prensky, 2001). This naïveté results in traditional freshmen students not taking introductory computer classes. Berling (2010) found similar results with 18.9% of freshmen completing an introductory computer course compared to 51.5% of other online learners. The combination of low self-directed learning, low introductory computer course completion and new college attendance result in freshman students that have limited experience in the online learning environment
prior to their first distance course. The opposite was found for seniors, who were more likely to have completed an introductory computer course, (Angiello, 2002), have more earned credits (Dupin-Bryant, 2003; Berling, 2002) and have increased success in the online environment (Pascarella and Terenzini, 2005; Bean & Metzger, 1985).

Nora, Barlow and Crisp (2005) found multiple variables played a factor in retaining first time freshmen college students. They were GPA, early college performance, costs, financial aid, full-time versus part-time enrollment, course-taking patterns and demographic variables of gender, age race. Given these findings it could be hypothesized that similar results could be found in this online retention study given that many of the proven variables are shared between studies. Muse (2003) in a study of 1,028 students ranging from freshmen to graduate students found that younger students and the number of credit hours attempted in a semester resulted in a slightly negative retention result. These same students tended to exhibit less confidence and little background training to prepare them for online learning. Doherty, (2006) showed a correlation with increased number of total credit hours completed, the more credit hours completed the more likely a student was to pass an online course. Additionally, a weak correlation was established between credit hours attempted and online course failure. Therefore, the more credit hours a student attempts per semester the less likely they are to successfully complete the online course (Doherty, 2006). While the correlation was weak it is consistent with Muse (2003), who also found that students who work more than 30 hours per week must juggle life and academic calendars and the more credit hours attempted per semester the greater the over commitment and negative time management
results. Students who over committed may tend to look for help late or begin assignments without the full time and understanding necessary to successfully complete the assignment resulting in unsatisfactory outcomes (Diaz, 2002). Overbooking the available time is becoming an area of concern that research is showing plays a factor in successful completion. As older students with more life commitments enroll in online course they do so predominately as part-time students (Lynch, 2001; Murray, 2001). It has been reported that two-thirds of community college students attend on a part time basis (Powers, 2007). Many factors contribute to part-time status, a decline in eighteen-year-olds as a percentage of the population, an increase in students working due to the rising cost of college and more women, minorities, underprepared students and first time college attendees are attending college for the first time. (Cohen & Brawer, 1996; Thayer, 2000). Additionally many students now attend community colleges as a way to enhance job skills or for personal enrichment which reduces the number of credit hours taken per semester (Derby & Smith, 2004). Diaz (2000a), Gibson & Graff (1992), Thompson (1998), Henson (2013) found that online students are typically older, have completed more college credit hours and more degree programs and have a higher GPA than their traditional counterparts. MOCC shows similar part-time data with approximately 44% of students attending part time (MOCC, 2013) and the number of credit hours per student at 10.51. This puts a large number of MOCC students in the part-time enrollment category and supports earlier reported research from Muse (2003) whose study of 1028 students were enrolled in 9.07 credits hours per student. The research and data suggests a learner with more life experiences that suit the online environment with independent self-
directed learning. “Online learners are self regulated, they know how they learn, how to
learn, how to reflect on learning, how to initiate learning and how to use time
management skills efficiently. . . .Mastering these skills enable online learners to make
efficient learners, to make efficient use of their time and available online resources”
(Vonderwell & Savery 2004). A contradiction to the reported research above from 2005
found no difference in the number of credit hours and success in the online environment
(Wojciechowski & Palmer, 2005). This same study also found that online success
showed significant differences when comparing 8 week to 16 week courses. The shorter
8 week course had greater levels of academic success in an online format.

Considerable explanation about the differences between degree programs and
career motivation was discussed in the previous section. It bears repeating with
additional support because the degree variable impact academic level directly. Separate
studies have shown that career and technology related degree programs lead to increase
retention. Freshmen and first- time college students in general business or
accounting/marketing degrees showed that declaring a major with a career with perceived
practical value retained students long term (Willcoxson & Wynder, 2010). Further
research found that 66% of health and human services students who passed their online
courses were seniors (Pascarella and Terenzini, (2005). Health fields showed increased
retention and most of these students were more likely to be seniors (Berling, 2010). It is
believed that seniors complete online courses at higher rates comparatively to other
academic levels is due to extrinsic motivation and the nearly tangible career goals (Bean
In a contrasting set of findings, freshmen have been shown to benefit from taking online courses early in their academic careers as well. In a study of 9,200 first time freshmen the students who took at least one online course showed an increase in persistence from the fall to spring semesters and freshmen to sophomore year (Fike and Fike, 2008). Other outcomes from this study showed a correlation with the number of credit hours enrolled in the first semester and future retention while the number of credit hours dropped during the first fall semester decreased the odds of long term retention. These findings support the reported work by Mohammadi (1994) who demonstrated a positive relationship between hours enrolled; hours completed and successful academic persistence. Having success in online courses as a first-time freshman is vital since 60% of respondents covering 1434 community college students reported they took at least one fully online course (Pearson Foundation, 2011). The faster a student becomes familiar with the online environment and has success the better the chances of continued success. It appears that community college students are being introduced to online courses early in their educations compared to only 20% of university undergraduates (U.S. Department of Education, 2009).

GPA is the next variable that mixes into the persistence in completing online courses debate due to the complexity of the multiple variables that impact student success leading to successful retention. “Grade Point Average is one widely accepted means of determining academic success and the degree to which students have learned what they
are expected to learn” (McAloon, 1994, p. 13). GPA is one of strongest factors that relate to successful completion of an online course, generally, the higher the GPA the greater the chance of successful online completion. (Muse, 2003, Wojciechowski & Palmer, 2005). Finally, Billings (1988) concluded that GPA among a few other variables (many included in this review of the literature) were the most important predictors of success in distance education.

Others have been able to put a numeric percentage on this importance with Owen (2003) finding that a positive relationship exist between community college students GPA and age with as much as 11% of the variance in GPA predicted by age. Taken further the combination of GPA and standardized test scores have be proven to account for as much as 25% of a student’s academic performance in college (Sparkman, Maulding & Roberts, 2012). Two separate studies and both illustrate with different correlated variables that GPA is an important factor in predicting college persistence. Astin (1993) agrees stating that “among the current admissions data available, a student’s high school GPA and standardized test scores were the two strongest predictors of college GPA.” This is important because college GPA is a reliable predictor of future college success. High school GPA is important because research suggest that students most likely to graduate college had higher GPAs in their freshmen year of college according to Robinson (1990). Bean & Metzger (1985) have proposed the theory suggesting that students with poor prior academic success are more likely to drop out further illustrating the importance of GPA as a credible predictor of college success.
Aragon & Johnson found that online course completers had higher GPAs than the non-completers; completers had an average GPA of 2.47 compared to an average GPA of 1.66 for non-completers. These results support the study of Tidewater Community College (2001), they found that students with GPAs under 2.00 were less likely to complete an online course, but students with GPAs between 2.00-3.00 had an equal chance of successful completion in an online course. Students with higher GPAs can be expected to complete more online courses successfully, potentially due to being more academically prepared. In studies of community colleges in Virginia and Washington State results showed that GPA exhibited positive results to successful online retention even though online students still had higher overall drop rates compared to traditional courses (Jaggers & Xu, 2010; Xu & Jaggers, 2013). Students with lower GPAs appear to be more at risk of dropping out and receiving lower final grades than those with higher GPAs (Figlio, Rush, and Yin, 2010). This increase in GPA can be viewed through the lens of increased preparedness coupled with an improved locus of control than makes the difference between success and non-success for college online courses. This type of learning environment has shown varied success in predicting success as a singular variable. Dzuiban, Hartman and Moskal (2004) found that completion rates of face-to-face and hybrid courses were equivalent while fully online courses were consistently lower when compared on an A – C grading scale. Others have found the opposite reporting that online and face-to-face traditional courses each produced students with equal final learning outcomes (Boghikian-Whitby & Mortagy, 2008; Friday et. al., 2006). Berling (2010) found a relationship between GPA, senior year in college and STEM
fields as predictors of successful completion, the higher the GPA the more likely a student was to successfully complete an online course. Supporting the idea that seniors have greater success or those with more credit hours completed were Bernt and Bugbee (1993) who found students in distance classes with high pass rates tended to have advanced degrees. The advanced degree could be viewed as a proxy for higher than average GPA and total credit hours completed which have both been discussed as positive predictors of future success.

When social variables are introduced, it still appears that GPA is a reliable variable to determine future success. Research has determined that non-traditional students who are older, have more credit hours, a higher GPA tend have fewer course withdraws and more success in online courses (Diaz, 2002; Wojciechowski & Palmer, 2005; Cheung & Kan, 2002; Moore & Kearsley, 1996). High school GPA, college GPA and academic year in college was an important factor for traditional students and others have shown this to be true for online course retention as well. Tinto (1993), Dupin-Bryant (2004), White & Arugete (2007), found that among white students high school GPA, test scores and college credits completed, accurately predicted college GPA. Among minorities, a link was found between GPA and financial need. The researchers believed that students with financial needs maintained higher GPAs to maintain financial eligibility. In her 2013 study on computer efficacy and online retention Henson found women had significantly higher course grades and cumulative grade point averages (GPA’s) compared to men. Women earned an average of 2.56 in the surveyed courses while the male average was 2.21. She also found the cumulative GPA of women was 2.82
and with men a GPA of 2.63 was reported. Interestingly, there were no significant differences between women and men regarding course withdrawal rates.

Most data, but not all, agrees that GPA is a good predictor of online success especially when the GPA is high or low. Some new data is suggesting that GPA alone is no better at predicting online success than at predicting face-to-face success in the online environment (Hachey, Wladis & Conway, 2014). This research goes on to suggest that logically it appears that lower GPA students are at higher risk of drop-out it is not a guarantee in either online or traditional classrooms. As more students come to online courses with some previous online course experience, it appears that their success or non-success is a greater predictor of future success than GPA.

Based on the majority of the literature that a student with a high GPA, an academic standing that is closer to a senior than a freshman would be the most likely to have success in the online learning environment. Due to the elevated academic standing this student would also have successfully completed a high number of credit hours which was also found to be a positive sign in successful completion. Students in their first semester or even first two college semesters tended to perform poorly or drop online courses at higher rates when compared to other students. When GPA is interjected into the discussion the data appears quite obvious, the higher the GPA in college or high school (entering college) the better the chances are the student will find college academic success.
Prior Remediation Course(s) & Prior Online course at MOCC

Increased need for guidance on time and stress management, note taking, reading and writing and test related anxiety along with basic learning, technical and motivational skills are some of the limitations many incoming community college students headed for online course are deficient in (Hart, 1999; Muilenberg & Berge, 2005, Fike and Fike, 2007). The majority of these study and learning skills are limited to minority and first generation college students who enroll in remediation courses at a higher rate compared to traditional students with a history of family college graduates. “What if you’re a slow typist?” “That could be murderous because that is how you talk online, said Connie Broughton (Murray, 2001).” Students entering college underprepared is nothing new according to available data especially at community colleges where ninety-five percent of all community colleges offer remedial courses and forty-one percent of beginning students need these background courses (McCabe, 2000). On the MOCC campus the remediation is a full 50% of incoming students with 25% of all entering students not reading at the college level (Jaycox, personal communication, 2012). Clearly community colleges enroll a large number of at-risk students due widely to the open door acceptance policy.

Hachey, Wladis & Conway (2014) suggest a shortage of research on community college students that investigated prior student experience in online courses. What needs to be scrutinized more deeply is the past learning experience online course play on current and future online results (Haverila, 2011; Sharpe & Benfield, 2005). What is known is there appears to be a trend toward past online experience influencing future
results. Past coursework completed in the traditional manner does not prepare students for the types of learning necessary for the online environment (Vonderwell & Savery, 2004). Haverila (2011) reported a significant link between prior online learning experience and online learning efficiency and productivity which is supported by Henson (2013). Hachey, Wladis & Conway (2012) in a larger study reported similar results; prior online course experience resulted in increased numbers of students successfully completing current online courses with a grade of C-. What the study further showed is that students with no prior online experience had lower retention and success rates compared to those with previous online learning experience. According to the data available it appears that previous online experience helps to influence current and future online course success (Muilenberg & Burge, 2005; Hachey, Wladis & Conway, 2013; Wojciechowski and Palmer, 2005; Eisenberg and Dowset, 1990; Enrman, 1990; Dupin-Bryant, 2004; Park and Choi, 2009). The opposing view was reported by Rodriguez, Ooms and Montanez (2008) when they found no relationship between prior online course experience and increased future retention when focused on graduate courses. What was found was a negative relationship between numerous online course enrollments and course satisfaction. Supporting Rodriguez, et al. was Berling (2010), who found that STEM students were statistically less likely to have taken a prior online course, which has shown strong association to successful completion of online courses. This lack of previous experience did not limit their success. These students also had higher GPA’s than the mean, so the interaction of GPA to previous experience supports a link between the two predictive variables. Further supporting the idea that previous online courses are
not an exact variable is Boghikian-Whitby and Mortagy (2008) and Henson (2012), who agree that online technology skills are more important than previous online courses. This finding leads to the idea of online tutorials and increasing course orientations.

The value of previous online course experience as a metric for determining future online course success is made clearer when GPA is added as a variable. If a student has no prior online course experience then the chances of success are strongly linked to GPA (Hachey, Wladis & Conway, 2014). As the GPA increase up the scale the success in online course increases linearly for those with no prior online experience. But, when students do have some previous online education background, GPA is flat (Hachey, Wladis & Conway, 2014). Simply, past online course success appears to forecast future success independent of GPA and those students with prior non-success in online courses have low future online course success. What Hachey (2014) further reported was that students with past online course success had the best chance of future success, those with no previous experience had more modest success, finally student with prior online non-success having the lowest chance of future success. It appears that successful past online course experience is a better predictor of retention and online course success than GPA. This knowledge is important for student and advisor to understand especially for first semester freshmen taking online courses is that they could be pre-determining future student success early in a student’s college career.

If a student does not have a previous online course experience to fall back on then a proxy might be an online class orientation. According to Wojciechowski and Palmer (2005) class orientation was the second most predictive variable of success following
only GPA for online students. Students that participate in a course orientation are more successful online. Henson (2013) reported that the increased retention when the orientation was in the first semester of student attendance. This is important because online courses fill up much faster than traditional courses due in part to limited scheduling times, student leading more overbooked lives looking for flexibility (Dutton et. al., 2002; Aslanian, 2001). Another similarly related area to past online course experience is previous online course withdrawals. As expected the fewer withdrawals from online courses in the past the higher success in the future. It is thought that the student has gained the self motivation and learning skills in the past to be successful in the future.

The course orientation was also linked by Wojciechowski and Palmer (2005) to entrance exam test scores (ASSET Reading and ACT English) which show a trend toward increased standardized test scores and online success. This means the higher the exams scores the increased likelihood a student would be successful in online coursework to the C grade level and above. Similar results from Gubernick and Ebeling (1997) found that online students scored up to 10% higher on standardized test compared to face-to-face students. Developmental math courses show a trend as well. Students that successfully completed a developmental math course showed higher odds of long term retention compared to those that did not successfully complete the course. Also, students who enrolled and were not successful were still more likely to persist than those that did not enroll in a developmental math course (Fike & Fike, 2008). Developmental reading courses followed a similar trend with the exception that students that did not take the
development reading course did slightly better than those that did enroll and fail. Overall passing a developmental reading course was the strongest predictor for retention in the Fike and Fike (2008) study and corroborates work from Dixon (1993) and Fleischauer (1996). What this data shows is that students can succeed when their developmental needs are met especially as the needs relate to reading, writing and math. When these needs are not met “students are finding it difficult to cope with a normal college course workload” (Lau, 2003, p. 2). Others have found mixed results in the developmental coursework area, but a link does appear to be present between literacy level and online success (Phillips & Merisotis, 1999). A final study by Argon & Johnson (2008) found that no association existed between developmental courses such as math, reading and English and the success or lack thereof for online students.

Columbia University’s Community College Research Center found that online courses help improve enrollment of at-risk students but that these same at-risk students are less likely to finish college when they attend online. The most at-risk and least prepared students are not good candidate for online courses. The results are mixed regarding learning outcomes and fully online courses. One study finds no difference between traditional courses and the next finds differences in long term learning differences between the two dominate delivery methods. What is clear is that low-income and academically underprepared students are at great risk of dropping out and non-completion (Jenkins, 2012). This is an important issue for community colleges, as mentioned earlier they enroll a disproportionate number of at-risk, non-traditional, first time college students and minorities. Each of these categories has been shown to
ONLINE RETENTION

experience an increased chance of drop out from higher education. Many of these students lack fundamental computer skills and some are still newcomers to the Internet. Further illustrating the point is that college students used to gain computer skills in college now these same computer skills are required to enter college (Palmieri, 2008; Dupin-Bryant, 2004). A key factor in any student’s first experience with online courses and success or lack thereof will formulate and potentially forecast their future success in the online environment. It might not be in the best interest of colleges to place these students in online courses when they are under prepared, with little emotional or technical support and encourage them to take as many online credit hours as possible (Jenkins, 2012). One way to reduce this isolation is to place students with substantial remedial needs into co-hort learning communities to promote learning and retention (Tinto, 1993). This support network could help to inform the group of struggling students who could get help from peers or feel more comfortable approaching the instructor for additional technical or educational support. Supporting a student as they transition to a new and unfamiliar role is vital as a student begins to adopt the skills that are necessary for their new learner role (Tinto, 1988). Anxiety is at its highest during the early part of this new transition and academically underprepared students are even more at risk of dropping out. This is the most crucial time to make sure students are placed on a path to success by improving remediation coursework and gaining the necessary computer skills to be successful going forward.
ONLINE RETENTION

Student Characteristic Variables

Gender; Age; Financial Assistance

As technology has improved the ability to transfer data from the instructor to students has improved as well. This has resulted in equality between learning amounts and retained knowledge in online and face to face courses (Friday, et. al., 2006; Boghikian-Whitby and Mortagy, 2008). This however does not mean differences in online courses do not exist. Some of the common research topics are student characteristic variable such as gender, age and financial assistance. Often these variables are used as proxy items to aid in understanding socioeconomics in education. The first variable of focus will be the performance differences between women and men in the online environment.

Martin (1990) found a one percent difference between women and men regarding drop-out rates with men dropping courses more than women. This is consistent with other reports that women perform better in the online environment than men. Additionally, White and Asian males dropped out at higher rates than White and Asian females (Foote, 1999). Overall it appears that women are not only more successful in online courses, they also receive higher grades. Women’s success with online courses was true of a study in two business management courses covering both online and traditional delivery methods (Friday, et. al., 2006; Hartman, Dziuban, Moskal, 2000). It was speculated that the increased female grades is due to the way each gender uses online communication with women focusing their online communication toward supportive
collaboration with men focusing in a competitive fashion (Arbaugh, 2000a, Rovai, 2001; Henson, 2013). Going deeper into the data from the business management study showed that men in online courses performed lower than men in traditional classes as well.

Argon & Johnson (2008) found a small difference between genders with women completing online courses at a higher rate than men, 66% to 52% while Doherty (2006) reported similar results, 65% for females to 59% for males. These results are supported by others such as Rovai, (2001), Whiteman (2004), DiPrete & Buchmann, 2006 and Henson, 2013. The opposite was reported by Park and Choi (2009) who found gender did not make a difference in retention which supports works done by Kemp (2002), Wojciechowski & Palmer (2005) and Berling (2010). It is important to note that women represent 56% of all undergraduate enrollments and 57% of non-traditional student enrollments in post-secondary education. These figures are consistent with MOCC internal enrollment data which shows that MOCC had higher female enrollment compared to male over each semester included in this study (MOCC, 2014).

Understanding the dynamic gender plays is important since women also make up 60% of the lowest income students so financial assistance is vital for this group to persist (Peter & Horn, 2006). Contrasting results to female success were reported in 1995 resulting from a Virginia community college which found that women withdrew more than men and those women age 20-25 were nearly two percent more likely to drop out than students 19 and under (Sydow, and Sandel, 1996). The primary reason given for the older student’s decision to drop: work conflicts. The time commitment of older students is commonly cited as a reason for non-traditional reduced retention.
Much of what we know about adult learners is from traditional classrooms with adult online learning an area of limited research (Lim, 2001). Obtaining an advanced understanding of how to retain adults in the online environment is important for colleges to meet enrollment and graduation demands. Enrollment jumped for non-traditional students during the United States economic downturn beginning in 2008. In reality the number of non-traditional students has been increasing since 1970 from 28% to 44% in 1996 (U.S. Department of Education, 1996). With respect to gender, females make up the most rapid increase in post-secondary college enrollments (National Center for Educational Statistics, 1995). With the average age of a MOCC student at 25 years importance of understanding how non-traditional students learn and react to online education is close to home. Doherty (2006) found similar student age demographics in his study of nearly 11,000 students at a community college in Nevada. Another variable that MOCC non-traditional share is registering in less than full-time status, with the average student enrolling in 11 credit hours per semester (MOCC Internal Enrollment Statistics Update). It is clear that most adult learners are enrolled in less credit hours than younger traditional students. In one study students age 25 and older who had attempted six credit hours or more in a semester were retained 66% of the time while students 25 and older who attempted 5 credit hours or less in a semester had only a 46% persistence rate (Foote, 1999). The credit hours debate is an interesting variable for non-traditional students since some research reports attrition rates ranging from 7.5% for enrollment in one online course to a high of 34% for enrollment in three online courses per semester (Lynch, 2001). In a follow up study to determine why students had dropped an online
course Argon and Johnson (2008) found that 34% of respondents cited personal time as the main reason they did not complete their online course. The verdict appears out on the age to credit hours relationship. What is known is that older students tend to drop more and enroll in less courses per semester than traditional students.

In a study comparing traditional face-to-face courses and online delivered courses it was found that a statistical difference did exist between adult/non-traditional students and those defined as traditional on pre-test exams. What was interesting about the study was the adult students had higher entry exams but no difference existed on course completion post test (Boghikian-Whitby and Mortagy, 2008). This shows that traditional and non-traditional students bring different computer skills into distance education but each end at a common point. It is believed that adults are more familiar with computers from a work related organizational frame while younger students are most comfortable with technology from a social media and gaming perspective. It is speculated that younger students must develop online learning and study habits that non-traditional students have gained from work history, maturity and life experiences (Boghikian-Whitby and Mortagy, 2008). Two other interesting findings from the Boghikian-Whitby and Mortagy study are that online students improve their class scores more than students enrolled in traditional courses and that non-traditional students improved their online course scores more over time. Age is a stated difference maker when determining learning styles as they relate to distance education (Gustentine & Keim, 1996). This could account for some of the variation in the pre and post test scores. Adults learn by actively engaging in the learning where traditional students reflect on the learning to fully
understand the knowledge. It appears that younger students need to build the self-motivation and independent learning styles adults appear to bring from work to the online classroom.

The traditional students that do enroll in online courses are more motivated than the average traditional student. This is contrasted to non-traditional students who have a wide diversity of factors for enrolling in online courses. The increased diversity of adult enrollment is due to the flexibility and ease of acceptability for busy over committed adults. An interesting note on traditional students shows that many students under the age of 24 exhibit one or more non-traditional demographics such as having children, divorced, or first time college attendee (Henson, 2013). For this reason age alone is becoming less reliable as a singular predictor variable but has relevance when paired with other variables. As was mentioned earlier GPA plays a significant role in the success of online students with age and GPA being highly linked (Owen, 2003). Sweet (1986) and Owen (2003) agree that age and gender account for 11% of the persistence of a distance education student. As a single variable age has been a significant but limited variable.

Park and Choi (2009), Argon and Johnson (2008) and Diaz (2000) found age made no difference in retention of online students. What Park and Choi did find was that students tended to drop online course more when the material did not relate to their own lives. This could be another key to understanding non-traditional students drop rates. Since older students bring more life and work experience into the classroom if the material does not meet their objectives they may find the course has little relevance and decide to drop. This is contrasted by works from Whiteman (2004), Muse (2003),
Doherty (2006) and Wojciechowski and Palmer (2005) who reported that older students were more likely to persist compared to younger traditionally aged students. Interestingly the Wojciechowski and Palmer had an average age of 25 years in their study which is still a non-traditional but lower than many early studies. They speculate that younger students are enrolling in the online courses and will continue this new trend (Taylor, 2006). This is problematic since younger students especially under 30 tend to perform poorly in online courses (Willis, 1992)

As previously discussed, online students tend to be older and earned more credits with a higher GPA than traditional students (Diaz, 2000a; Moore and Kearsely, 1996). The age difference may be a key to success for some non-traditional students because they can bring life experience into the virtual classroom where independent learning coupled with more earned credits in higher education results in course retention. Two additional ideas have been put forth about age and online retention; the first states that adult students tend to drop online courses for the “right reasons” (Diaz, 2002). The belief is that the older students have more life experience and therefore see that they will be unsuccessful in the course so they drop to maintain their GPA. The second idea is that with a higher GPA, partially due to dropping the online course, the student has less financial burden because they don’t have to re-take the course or be placed on an academic probationary status which could jeopardize financial aid and Pell Grants. Based on these two ideas from Diaz (2002) it has been speculated that more traditional students should drop courses instead of taking a D or F and negatively impacting their GPA and potentially financial awards.
Seventy-four thousand Missouri students received $104 million in state-based aid in 2012-2013 (Missouri Department of Higher Education, 2013). It is no secret that college costs are rising quickly which is putting a college education out of reach for many students. The financial assistance is of particular importance for students that come from the most at risk socioeconomics. External factors such as time constraints and financial problems are often listed as reasons for dropping online courses by adults (Park and Choi, 2009). The more support from work and family a student receives while in the virtual classroom the less likely they are to be burdened with issues such as finances and work/life balance which often leads to drop outs. Financial assistance was not found to influence the completion of students enrolled in online courses according to Argon & Johnson (1998) and Tinto (1993), but was a good first year predictor of retention according to Fike and Fike (2008), Kirby, White & Aruguete, (2007), Terenzini et. al., (2001), and Berling (2010).

Employment has been shown to be a positive and negative factor related to completion. Astin (1991) found full-time employment limited persistence while Iwai and Churchill (1992) found the opposite with full-time employment leading to success. It could be speculated that the success of full-time workers was due to their maturity level and motivation, both factors that have been discussed in detail earlier. Furthering the finances discussion was Parker (1999) who reported that the source of a student financial assistance coupled with a students’ locus of control could predict up to 85% accuracy of student drop-out. Furthering the discussion is a report about students who worked only 1-9 hours per week or did not work at all. These students had the lowest withdraw rates
from a California community college, this helps to support the idea that full-time employment can lead to overbooking and student drop-out (Foote, 1999).

Workstudy as a form of financial assistance has been shown to increase retention more than loans or scholarships (Pascarella & Terenzini, 2005). While any form of financial assistance reduces student stress and need to work it is speculated that work-study further integrates the student into the campus culture. This was particularly important for STEM students who are often underrepresented in post secondary education. The idea that finances play a crucial role in a student’s ability to persist to course completion is further supported by work discussed earlier from Nora, Barlow and Crisp (2005) who listed financial aid as a key student characteristic along with age and gender to predict retention.

Web-based courses are more popular which was highlighted in discussion about prior online courses and their relevance to retention. As more and more students enroll in web-based courses colleges are gaining large sums of additional course fee incomes from online courses. The increased cost of web courses does not seem to reduce the enrollment numbers (Brown, 2012). This is true of MOCC where an additional fee is assessed to every student in every online course. Over the academic year the college experiences an additional revenue stream that can add additional stress and burden to students that we have seen need a reduction in stress related to college attendance. Additionally, how dedicated are colleges to improving retention when they can keep increasing revenues by making students retake courses if they are unsuccessful. The fees associated with attendance are another limiting factor to those students that come from
socio-economic disadvantaged backgrounds which typically start their post-secondary education at a community college (Thayer, 2000). It has been reported that receiving financial aid increased low income students attendance by 9% but an increase in tuition of an equal level reduced attendance by 3.4% (Terenzina, et.al, 2001). Fike and Fike found that receiving financial aid was a good predictor variable for student retention. This is important since others have reported that students with the greatest financial need tend to persist and the lowest levels (Wessel, et. al., 2006; Berling, 2010) with community college students claiming financial hardship are the most important reason for failure (Zhai and Monzon, 2001). Wlodkowski et. al. (2002, p. 2) says it bluntly “financial aid enhances adult student persistence”.

Historically distance education has been a part of the American educational establishment since the establishment has existed in one form or another. Many prominent theorists have focused research efforts on determining why students fail to complete coursework. Eleven of the most common variables were discussed in an interconnected method for greater understanding of the combined relationships. The following chapter will explain how the research project will be carried out and what statistical design will be used to determine significance between the multitudes of interconnected variables.
CHAPTER THREE: METHODOLOGY

Community colleges have historically been the educational site for underserved populations (Cohen & Brawer, 2003). Many community college students are reaching to achieve a college education which is facilitated by the open door policy of community colleges and the flexibility of an online education. This is troublesome since many of the non-traditional and adult learners will drop their online courses prior to completion (Carr, 2000; Diaz, 2002; Mitchell, 2009). The reason for this is variable and is often student specific. Research has suggested that prior family and work commitments, gender, GPA and technology issues are some of the factors responsible (Miller, 2007; Muse, 2003; Doherty, 2006; Park & Choi, 2009; Berling, 2010). As online courses and student enrollment continue to increase, the question is becoming, how relevant are online courses when research suggests students drop online courses at significantly higher rates than traditional coursework? This is a difficult question to answer given the limited understanding on why students complete, fail or drop online courses (Muse, 2003).

The research design of this study will be centered on the relationships between multiple variables and their ability to outline student success in the online environment. The data will be obtained from Missouri Community College (MOCC) covering academic years 2010-2012. Analysis will be done using a logistic regression statistical approach. One of the goals of this study is to add to the existing research by contributing to the understanding about successful online course completion specifically at community colleges. A second goal is to determine if the study variables can outline an outline of a successful online education student. With this knowledge MOCC can better advise
students about the best course approach to degree completion. The objective of outlining student success variables also allows the researcher to determine what variables unsuccessful students share.

The remainder of the chapter will describe the purpose and validity of this research project followed by the research questions leading the study. The study design will be explained in detail, highlighting areas such as the study population and the methods utilized for data collection. The process of protecting human subjects will also be illustrated. The chapter will conclude by focusing on the data analysis methods, reliability and validity of the chosen data analysis techniques and finally, a summary statement correlating all the research methods together.

This study was intended to examine multiple independent variables and one categorical dependent variable in an attempt to determine the outline of a successful student enrolled in online courses at MOCC.

**Purpose of Study**

The purpose of this quantitative archival data analysis study is to test the empirical relationship between 11 variables (10 independent and 1 dependent) which are believed to relate to successful completion of online college courses at Missouri Community College (MOCC).
Research Questions

The research questions guiding this study are:

1. How do student level factors relate to successful online course completion?
   a. $H_{01a}$ College division is not related to successful online course completion
   b. $H_{01b}$ Academic level is not related to successful online course completion.
   c. $H_{01c}$ Academic semester is not related to successful online course completion.
   d. $H_{01d}$ Prior enrollment in remediation course(s) is not related to successful online course completion.
   e. $H_{01e}$ Prior enrollment in an online course is not related to successful online course completion.
   f. $H_{01f}$ Student gender is not related to successful online course completion.
   g. $H_{01g}$ Student financial assistance is not related to successful online course completion.
   h. $H_{01h}$ There is no significant difference in the number of credit hours taken between those successful completing an online course and those that do not.
i. $H_{01i}$ There is no significant difference in the grade point average between those successfully completing an online course and those that do not.

j. $H_{01j}$ There is no significant different in student age between those successfully completing an online course and those that do not.

2. How do the student level factors predict successful online course completion?
   a. $H_{02}$ There are no significant linear relationships that explain the variance between student level factors and successful online course completion.
   b. $H_{a2}$ There are significant linear relationships that explain the variance between student level factors and successful online course completion.

Previous studies have explored student attrition focusing on singular variables to determine why students drop online courses more than traditional classroom courses (Doherty, 2006; Willcoxson & Wynder, 2010, Tinto, 1975, Bean & Metzger, 1985). This study focuses on how multiple variables relate to student success in the online learning environment. This will be done using one community college in Missouri. Other researchers have shown mixed results when trying to isolate the predominate singular variable that illustrates success in online courses (Muse, 2003; Doherty, 2006). An additional factor for practitioners is the limited number of studies that focus on community colleges and online coursework success (Muse, 2003). This study will begin to fill the holes in the existing research by attempting to determine an outline of a
successful student enrolled in online classes at MOCC. Furthermore, if a relationship
does exist between predictor variables, statistical analysis should provide the probability
that a student exhibiting the isolated predictor variables will be successful in the online
environment. The knowledge of the probability of success could be valuable to
counselors when advising students especially those at risk for non-completion of courses
in the online environment.

The existing concern over educational outcomes from politicians is continuing to
increase. Political leaders are concerned about results for dollars spent on higher
education. Students dropping courses results in a loss of revenue to the college due to
reduced tuition and government subsidies (Muse, 2003). The drop rate in online courses
is further compounded because the dropped students theoretically took the place of
students that could have completed the course, therefore, maintaining or possibly
increasing revenue to the institution. Keeping students enrolled has a two-fold benefit for
the institution in increasing revenues and moving more students toward course and
degree completion. As the financial aid system for a higher education is changed by
politicians, institutions and students are forced to complete courses in a narrowed
timeline along with reducing course repeats. Students who do not persist but have
financed their attempted education have an even bigger concern with lifetime student
loan debt and lack of acquired knowledge from the online courses they dropped or failed.

This study is uniquely positioned since it has the potential to answer some of the
common questions regarding why one student is successful in online coursework while
another is unsuccessful in Missouri community colleges. It also should show the
statistical probability that the independent variables for success will occur. These known variables can lead to increased course retention, appropriate advising and revenue increases for colleges resulting in better political relationships. The more courses a student completes, the more they should matriculate toward degree completion further favoring the governmental degree attainment objectives set forth by President Obama and Missouri Governor Nixon in 2009.

**Design for the Study**

This quantitative study will analyze archived data from students enrolled in an online course(s) at MOCC. Students were able to enroll in roughly 130 online courses between academic years 2010 – 2012. Students enrolled in each course on their own will without interference from the study researcher. The data was gathered through MOCC data servers on the main campus. The independent study variables are college division, gender, age, academic grade, prior remediation course(s), GPA, financial assistance, enrolled credit hours in semester, prior online course at MOCC and semester (see Table 1). The dependent study variable is successful completion of the online course. The study objective is to add to the knowledge of what possible predictor variables make for a successful online education student. Unsuccessful completion of the course will be defined as the letter grade of F and/or drop/withdraw. Successful completion will be finishing the course with a letter grade of D (on an A-F scale) or higher and no drop/withdraw, which follows the work of Berling (2010); Doherty (2006) and Muse (2003). Students auditing a course(s) and courses graded pass/fail were removed from
consideration for this study since these students do not have the potential to receive a final grade.

Population and Sample

The population served by MOCC is made up of 5 counties with an estimated population of 130,000 people (US Census, 2012). MOCC has a campus enrollment of nearly 4,000 continuous students (MOCC, 2012) which covers the main campus and 5 outreach campuses. MOCC has an open enrollment policy which is standard for community colleges in the state of Missouri. The open enrollment process allows for many of the 130,000 individuals to have equal access to participation in the study, providing the potential student is above the age of 16 years. The study is designed with an archival methodology covering academic years 2010-2012 and only those students who were enrolled in online undergraduate courses during these semesters were considered. By using archival data there was no influence by the principal investigator toward enrollment or positive or negative course completion. Archival data also allows for reduced bias on the part of the investigator since the outcomes have already occurred (Berling, 2010).

The study sample includes students from the general population of MOCC enrolled in online courses covering academic years 2010-2012. These students represent multiple demographic characteristics such as age, gender, academic degree plan and academic grade. The complete list of demographic variables is listed in the Purpose of Study section. The total potential sample enrollment during the academic years of this
study would have been approximately 9,540 students (total MOCC campus enrollment from fall, spring, summer semesters 2010-2012). From this potential sample, 9,540 students enrolled in at least one online undergraduate course during the study years. This results in n=9,540. The sample selected for the study includes all students that enrolled in at least one online course during the study years. The sample represents students who received a passing grade of D or higher; F, drops and withdraws and does not include “audits” or pass/fail enrollment.

The sample size of 9,540 cases should be sufficient to meet even small effect sizes based on the work of Miles and Shevlin (2001) as reported in Field (2009). They state that to find small effect sizes at least 600 cases are necessary when using up to 6 variables. In this study there are 10 predictor variables so more than 600 cases will be necessary. At issue with regression is the exact number of cases necessary to enroll in a study. The rule Field (2009) states is the need for 10 -15 cases of data for each predictor variable in the study. Using the 10 independent variables in the study multiplied by 10-15 necessary cases, according to Field (2009), results in a potential n of 100-150 cases needed for this study. Further reported rules delineate between the desire to test the model or the individual variables. In this study the desire to test the variables is necessary so the necessary calculation would be 104+k. In this calculation k is the number of variables. Using this calculation 104+10 = 114, similar to the outcome reported by Field (2009) and Pallant (2010). Overall, the data is very unclear on an exact number of cases in a diagnostic statistic such as regression analysis. “The simplest rule of thumb is the bigger the sample size, the better!” (Field, 2009, p. 222).
Using similar studies and statistical analysis as a reference continues to show that the 9,540 cases are sufficient to illustrate an ample effect size and test the study variables. Studies by Berling (2010) focused on retention in a university setting and had 1,493 cases enrolled over 12 predictor variables with some duplication of enrollees. In an unduplicated study Muse (2003) had 1,028 students enrolled in a study focused on risk factors of community college students in online courses. Finally, Doherty (2006) enrolled 10,466 students when researching multiple factors for student retention in online courses. These three studies used students from the general student population with more than one independent predictor variable and each of these similar studies had a categorical dependent variable and used diagnostic regression analysis as well.

Data Collection and Procedures

This study utilized archival data from existing MOCC database (Jenzabar Learning Management System, 2012, version 4.2.2). Permission was granted by the president of MOCC to use necessary archived data and access to campus resources (servers, employees) to locate, retrieve and use necessary desired data. This request was made in person by the principle study investigator and was confirmed prior to the study beginning. To obtain this data a request was made to the MOCC Instructional Technology (IT) department to query the academic servers for the desired variables. Necessary variables will be downloaded into a comma delimited file (.csv) and transferred via external storage device (Lbd, U172P) to the principal study investigator.
The retrieved archived data was then input into the program Statistical Package for the Social Sciences (SPSS v. 20) for logistic regression analysis.

Table 1  
**Explanation of Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Variable Type</th>
<th>Indicator Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College Division</td>
<td>Dichotomous</td>
<td>Arts &amp; Sciences, Career &amp; Tech</td>
</tr>
<tr>
<td>Age</td>
<td>Continuous</td>
<td>16+(group)</td>
</tr>
<tr>
<td>Cont. from Table 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Dichotomous</td>
<td>Male, Female</td>
</tr>
<tr>
<td>Academic Grade</td>
<td>Categorical</td>
<td>Freshman, Sophomore, Sophomore-Advanced</td>
</tr>
<tr>
<td>Prior Remediation course(s)</td>
<td>Dichotomous</td>
<td>Yes, No</td>
</tr>
<tr>
<td>GPA</td>
<td>Continuous</td>
<td>0.0-4.0 (group, regression)</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>Dichotomous</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Hours Attempted</td>
<td>Continuous</td>
<td>1-24 (group, regression)</td>
</tr>
<tr>
<td>Prior online courses</td>
<td>Dichotomous</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Semester</td>
<td>Categorical</td>
<td>FA10, SP11, SU11, FA11, SP12, SU12</td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successful completion of online course</td>
<td>Dichotomous</td>
<td>Yes, No</td>
</tr>
</tbody>
</table>

**Human Subjects Protection**

All data analyses for the study will be done using de-identified archived data recovered with the permission of MOCC. The data will be requested from MOCC data storage servers. Request will be made to receive only de-identified data that will exclude any identifiable characteristics of study participants such as name, student number or social security number, therefore, no consent is required. Complete participant anonymity is a
goal of this study and strength of using archived data. By using archived data the
possibility that the study author could come into contact with a potential student(s) is
reduced since a large number of study sample students should have graduated and no
longer be currently enrolled at MOCC.

Data Analysis

This study used de-identified archival data with permission from MOCC to
investigate the potential probability that the study independent variables could predict
success or failure in fully online undergraduate courses. The archived data was from
academic years 2010-2012 and covered 9,540 students (n=9,540). The data was analyzed
using chi-square to analyze the categorical and dichotomous variables (Table 1). An
independent t-test was used on the continuous variables. Once significance of the 10
independent variables was determined a logistic regression analysis was used to
determine which variables had the strongest probability of predicting successful
completion in online courses at MOCC. Logistic regression analysis was used to
determine if a dependent categorical outcome variable, did students pass the online
course with a D or higher, illustrates predictive differences between 10 independent
predictor variables. The 10 independent variables are categorical, continuous and
dichotomous. The independent variables are college division, gender, age, academic
grade, prior remediation course(s), GPA, financial assistance, enrolled credit hours in
semester, prior online course at MOCC and semester (see Table 1).
The data analysis software will be SPSS v. 20 from IBM Corporation. The study will utilize a data input with a forced entry design ($\alpha=0.05$) with no block or categorization of independent variables. Results ranging from 0 (unlikely) to 1 (likely) will predict the probable outcome relationship the independent variables have on the dependent variable based on the maximum-likelihood estimation for coefficients. Additionally, a Wald statistical analysis to determine the difference from zero of the predictor variables will be run. The Wald statistic is used to determine if the predictor variable is a significant predictor of the outcome.

The study equation (Field, 2009) will be:

$$PY = \frac{1}{1+e^{-(b_0 + b_1X_1i + b_2X_2i + \ldots + b_nX_{ni})}}$$

The Wald statistic will be:

$$Wald = \frac{b}{SE_b}$$

**Reliability and Validity**

The logistic regression statistical measurement was partially chosen due to the ability of the test to predict which of two categories a variable will fall into given the collected data (Field, 2009). Additional reasoning for using logistic regression is based on the ability of logistic regression analysis to determine future predictions, without using variables that contain linear relationships like those necessary for a linear or multiple regression analysis. Retention research has also shown that when a single dichotomous dependent variable, like the one used in this study is used, logistic regression is the most appropriate statistical approach (Porter, 1991; Willett & Singer, 1991).
Logistic regression was said to be “superior” by Caison (2006, p.439) and “well suited” by Peng, et. al, (p. 260) for higher education retention studies. The primary reason is the ability of logistic regression to illustrate the relationship of a dichotomous dependent variable (pass or fail online course) and numerous independent variables (Caison, 2006). This is especially important when the independent variables are both continuous (example, GPA) and categorical (example, academic grade) which is the case in this study. The use of a categorical outcome variable, as in this study, is the key point that differentiates using logistic regression or a linear regression like multiple regression (Peng, So, Stage & St. John, 2002).

Research studies looking at retention rates in higher education from Doherty (2006) and Berling (2010) also used logistic regression due to the dependent variable being categorical. Both of these researchers choose logistic regression analysis since it could “test the amount of variance explained by the combination of demographic attributes” (Doherty, 2006, p. 248). Multiple regression will also test each independent variable, but with numerous different variables it can become difficult to determine which variable made the largest impact, unless the variables are combined into a stepwise or factor analysis. Similar to reported data on retention in higher education it can become difficult to group variables. When variables are grouped it limits the potential to isolate the independent variable most responsible for statistical outcomes (Berling, 2010).

For these reasons logistic regression was determined to be the best fit for the study to predict the probability that numerous independent variables (categorical,
continuous and dichotomous) and one categorical dependent variable (successful course completion: yes(y) or no (n)) resulted in a related relationship.

**Archival Data Reliability**

Archival data analysis is a useful method to investigate relationships for retention studies. Archived data is a positive research method because data is readily available and it can be replicated in many cases by similar institutions with minimal bias from the researchers. Disadvantages of using archived data are that the data may limit some analysis measures, reduce the potential for qualitative investigation and limits the ability to use current trends as study variables (Boyd, Dees, & Rasheed, 1993).

**Limitations & Assumptions**

**Limitations**

Only two academic years (2010-2012) were investigated. This study only covered undergraduate online courses at one community college in Missouri. Online courses were taught at freshmen and sophomore college levels numbered 0095-2999. There was no delineation between courses that were required for particular degree completion or elective credit. Additionally, remediation courses were not delineated from non-remediation courses. Average drop rates for courses were also not considered. This study did not attempt to correlate positive completion in the online learning environment with final degree completion nor future success in higher education. This
study was done using quantitative research methods only with data harvested from archival files. Using quantitative data did not allow for student personality, learning style or opinion toward the instructor or course design as factors.

This study did not consider instructional design, faculty expertise or experience. Course interaction between student and instructor was also not a factor in data analysis. Additionally, special accommodations for underserved educational population’s access to online courses at MOCC were also not considered. The study treated all online courses as equal by default treating all instructors teaching techniques and methods as equivalent. This study also presumes that all students had equal desire to enroll in the course that was under analysis. Finally, the study only considered students enrolled at MOCC during the study years. Students could have taken online courses or remediation courses at institutions prior to MOCC.

Assumptions

Based on the data harvesting techniques, multiple students could have taken more than one online course during the academic years the study covers. This has the potential to alter the outcomes of analyzed data, even so, the study will not control for this factor. This decision is based on the research question of the study and the desired final outcome. The purpose of the study is to determine an outline of a successful online student. If a student successfully completes multiple online courses, the statistical potential to reinforce the hypothesis of the study is validated. Equally important, if a student takes and unsuccessfully completes multiple online courses then that student’s outline will reinforce the predictor variables that trend toward unsuccessful completion.
Courses covered in this study will not be differentiated as being mandatory or elective for overall degree completion.

Personal information was not requested such as, but not limited to: student name, student number, student social security number, online course instructor name, employee number or course section number. The objective is to eliminate any potential for the study author to match study variables with a particular student or instructor on the MOCC campus. Eliminating identities of students will maintain the potential that the study population is representative of all community colleges. This should increase the ability of this study design and methods to be repeatable to other similar facilities. With the instructor blinded to the identities of the participants the potential for external errors will also be reduced.

Summary

This study used logistic regression statistical diagnostics to determine if a relationship existed between 11 independent predictor variables and one categorical dichotomous dependent variable. The purpose of this study was to add to the limited amount of research focused on community college retention in online courses. Another goal of this study was to determine which combination of variables would provide an outline of a successful online student at MOCC. The study analyzed 9,540 sample cases covering 130 fully online courses covering academic years 2010-2012 at MOCC. The descriptive analysis statistics are provided in Chapter Four – Results section.
CHAPTER FOUR: RESULTS

The purpose of this quantitative archival data analysis study is to test the empirical relationship between 11 variables (10 independent and one dependent) which are believed to relate to successful completion of online college courses at Missouri Community College (MOCC). This chapter presents the findings in four sections. Section one provides descriptive findings about student level variables. Sections two, three, and four address research questions one and two. Sections two and three address the first research question:

Research Question 1: How do student level factors relate to successful online course completion?

The variables associated with research question one were analyzed using chi square ($\chi^2$) (section two) or an independent samples $t$-test (section three), depending on the type of variable in question (i.e., dichotomous, nominal, continuous), to identify the significant independent variables. The findings are organized by the associated hypotheses for each section.

Section four presents the results of research question two:

Research Question 2: How do the student level factors predict successful online course completion?

The variables associated with research question two were analyzed using logistic regression to determine the outline variables that best predict successful completion of an online course at MOCC.
Section One: Descriptive Findings

Table 2: Successful Online Course Completion shows the total number of students that enrolled in online course during the analysis years of the study, with percentages. The table shows that 55% of the students were unsuccessful when taking an online course. The remaining 45% were successful in completing an online course at MOCC with a letter grade of D or higher.

Table 2: Successful Online Course Completion

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsuccessful Completion (F, Drop, W)</td>
<td>5,289</td>
<td>55.40</td>
</tr>
<tr>
<td>Successful Completion (A,B,C,D)</td>
<td>4,252</td>
<td>44.60</td>
</tr>
<tr>
<td>Total</td>
<td>9,541</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The students enrolled in arts and sciences courses made up approximately 54% of all students taking online courses compared to 46% enrollment in online course enrollment for career and technology courses (Table 3). It should be noted that career and technology students are required to take various arts and sciences courses during their degree plans. Comparatively, the arts and sciences students are not required to take any career and technology course to graduate.
Table 3: College Division

<table>
<thead>
<tr>
<th>Division</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts &amp; Sciences</td>
<td>5,104</td>
<td>53.50</td>
</tr>
<tr>
<td>Career &amp; Technical</td>
<td>4,437</td>
<td>46.50</td>
</tr>
<tr>
<td>Total</td>
<td>9,541</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Enrollment by academic level was made up of a range of academic grades: high school students, freshmen, sophomores and students with over 75 credit hours completed. The majority of students were sophomores and those students with over 75 credit hours, which made up a combined 86% of the enrollees (Table 4). Freshmen accounted for 14% (1,312) students while high school students accounted for only .30% or 25 students. In the most recent MOCC campus enrollment census a 9 student difference between freshman (1184) and sophomores (1175) was shown. High schools students accounted for 747 of the total enrollees on the MOCC campus but clearly are not taking online courses. The over 75 category had an enrollment of 427 students who appear to be taking numerous online courses while enrolled at MOCC according to spring 2014 enrollment census data.

Fall semester enrollment accounted for 44% of the total study students (Table 5). Following the normal trend at MOCC less students enrolled for spring semester courses, 38%, and even fewer students (18%) enrolled for summer courses.
Table 4: Academic Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Student</td>
<td>25</td>
<td>0.30</td>
</tr>
<tr>
<td>Freshman</td>
<td>1,312</td>
<td>13.70</td>
</tr>
<tr>
<td>Sophomore</td>
<td>4,016</td>
<td>42.10</td>
</tr>
<tr>
<td>Over 75 Hours</td>
<td>4,189</td>
<td>43.90</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 5: Academic Semester

<table>
<thead>
<tr>
<th>Semester</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>4,215</td>
<td>44.20</td>
</tr>
<tr>
<td>Spring</td>
<td>3,612</td>
<td>37.90</td>
</tr>
<tr>
<td>Summer</td>
<td>1,715</td>
<td>18.00</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Table 6 shows that 97% of students enrolled in an online course at MOCC did not have a remediation course prior to taking the online courses covered in this study. The low number of students in prior remediation prior to the study semesters is interesting since nearly 50% of all students need some type of prior remediation at MOCC.
Table 6: Prior Enrollment in Remediation Course

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>9,225</td>
<td>96.70</td>
</tr>
<tr>
<td>Yes</td>
<td>317</td>
<td>3.30</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Students who had previously enrolled in an online course prior to the study semesters accounted for 3,940 students or 41% of total participants (Table 7). Those with no previous online course experience accounted for 5,602 or 59% enrolled students.

Table 7: Prior Enrollment in Online Course

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>5,602</td>
<td>58.70</td>
</tr>
<tr>
<td>Yes</td>
<td>3,940</td>
<td>41.30</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Dramatically more females enrolled in online courses accounting for 77% of the total (Table 8). In fact, women were more than 3 times as likely to enroll in an online course than men were. According to the spring 2014 MOCC enrollment census more women (2,201) were enrolled in the overall college than men (1,332).
Table 8: Gender

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>7,320</td>
<td>76.70</td>
</tr>
<tr>
<td>Male</td>
<td>2,222</td>
<td>23.30</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The overwhelming majority of students enrolled in online courses received financial assistance (Table 9). Students receiving financial assistance were three times more likely to receive financial aid compared to those that did not receive financial assistance.

Table 9: Receiving Financial Assistance

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>2,221</td>
<td>23.30</td>
</tr>
<tr>
<td>Yes</td>
<td>7,321</td>
<td>76.70</td>
</tr>
<tr>
<td>Total</td>
<td>9,542</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The final three demographic variables are explained in Table 10. The figure shows that both credit hours attempted and GPA varied widely. Credit hours ranged from a low of 0 to a max of 29 hours enrolled with a mean of 9 credit hours enrolled. The 9 credit hours enrolled were consistent with the total student population at MOCC where students averaged 10.5 credit hours according to MOCC (2014) most recent enrollment data. Grade point average ranged from students with no currently recorded GPA (this
would not be uncommon for first semester freshman) to students with a 4.0 GPA with a mean of 2.91.

The final demographic variable is age. The ranges of age were from 16 to 64 with a mean age of 30 (Table 10). The mean age of online enrolled students was slightly higher than the total student population age of MOCC students which was 25 years in spring semester 2014 (personal communication, MOCC enrollment director, 2014). Both of these ages are considered non-traditional by the United States Department of Education.

<table>
<thead>
<tr>
<th>Table 10: Student Level Continuous Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>Credit Hours Attempted</td>
</tr>
<tr>
<td>8.80</td>
</tr>
<tr>
<td>GPA</td>
</tr>
<tr>
<td>Age</td>
</tr>
</tbody>
</table>

Section Two: Student Level Factors Relating to Successful Completion

\( H_{01a} \) College division is not related to successful online course completion.

Table 11 shows a significant relationship between the student College division and successful completion of online courses on the MOCC campus, \( \chi^2 (1, N = 9,540) = 78.739, p = .00 \). Students pursuing an Arts and Science degree were less likely to successfully complete an online course compared to students pursuing a Career & Technical degree. Therefore the researcher will reject the null hypothesis and accept the alternative hypothesis. This finding is important since a majority of the MOCC students
enrolled in online courses are identified as Arts and Sciences students: 5,104 arts and sciences students compared to 4,436 career and technical.

Table 11: Successful Completion vs. Not, College Division

<table>
<thead>
<tr>
<th></th>
<th>Arts &amp; Science</th>
<th>Career &amp; Technical</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>2,060</td>
<td>2,192</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>3,044</td>
<td>2,244</td>
<td>5,288</td>
</tr>
<tr>
<td>Totals</td>
<td>5,104</td>
<td>4,436</td>
<td>9,540</td>
</tr>
</tbody>
</table>

Reject the null hypothesis and accept the alternative hypothesis, $H_{a1a}$ College Division is related to successful online course completion.

$H_{01b} \quad \text{Academic level is not related to successful online course completion.}$

The null hypothesis will be rejected and the alternative hypothesis accepted because data analysis shows that a significant difference does exist between academic level and successful completion of an online course $\chi^2 (3, N = 9,541) = 451.497, p = .00$ (Table 12). While the overall student academic level variable was significant it should be noted that freshman were less successful than sophomores. Sophomores were less successful than the special students, those with over 75 completed credit hours who were the most successful.
Table 12: Successful Completion vs. Not, Academic Level

<table>
<thead>
<tr>
<th>Academic Level—Successful Online Course Completion vs. Not</th>
<th>High School Students</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Special (Over 75 hours)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>16</td>
<td>279</td>
<td>1,696</td>
<td>2,261</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>9</td>
<td>1,033</td>
<td>2,320</td>
<td>1,927</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>25</td>
<td>1,312</td>
<td>4,016</td>
<td>4,188</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Reject the null hypothesis and accept the alternative hypothesis, $H_{a1b}$ Academic level is related to successful online course completion.

$H_{01c}$ Academic semester is not related to successful online course completion.

A statistical difference was found between academic semesters $\chi^2 (2, N = 9,541) = 66.665, p = .00$ (Table 13). This significance illustrates that students enrolled in online courses in the fall semester were less likely to complete online courses compared to spring or summer enrollees. Interestingly, the spring semester had nearly identical completion and non-completion numbers. One possible explanation for the fall and summer semesters exhibiting lower completion rates are increased numbers of freshman enrolled in the fall and summer semesters as first time college students. Another reason proposed has been freshman have experienced the online environment by their second college semester. It is believed that this experience increases their chance of success.
Table 13: Successful Completion vs. Not, Academic Semester

<table>
<thead>
<tr>
<th>Academic Semester—Successful Online Course Completion vs. Not</th>
<th>Fall</th>
<th>Spring</th>
<th>Summer</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>1,763</td>
<td>1,800</td>
<td>689</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>2,451</td>
<td>1,812</td>
<td>1,026</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>4,214</td>
<td>3,612</td>
<td>1,715</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Reject the null hypothesis, accept the alternative hypothesis, $H_{a1c}$ Academic semester is related to successful online course completion.

$H_{01d}$ Prior enrollment in remediation course(s) is not related to successful online course completion.

Prior remediation classes did not show a significant relationship to successful completion of online courses (Table 14). This finding supports the hypothesis so the null hypothesis will be accepted. Only 317 students of the 9,541 students in the study had a previous remediation course prior to the study semesters. The low number of students requiring remediation prior to an online course could have influenced the findings. One explanation could be that students needing remediation are not taking online courses since online courses require advanced learning strategies that students requiring remediation often have not mastered.
Table 14: Successful Completion vs. Not, Prior Enrollment in Remediation Course(s)

<table>
<thead>
<tr>
<th>Prior Enrollment in Remediation Course—Successful Online Course Completion vs. Not</th>
<th>No</th>
<th>Yes</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>4,120</td>
<td>132</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>5,104</td>
<td>185</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>9,224</td>
<td>317</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Retain the null hypothesis, do not accept the alternative, H₁d Prior enrollment in remediation course(s) is related to successful online course completion.

\[ \chi^2 (1, N = 9,541) = 1.136, p = .287 \]

\[ \chi^2 (1, N = 9,541) = 6.116, p = .013 \]

H₀e  Prior enrollment in an online course is not related to successful online course completion.

The students that had an online course prior to the study years showed greater success toward completing another online course \( \chi^2 (1, N = 9,541) = 6.116, p = .013 \) (Table 15). The previous online experience could have given students the learning skills necessary to succeed in another online course. This seems clear given the limited difference between successful and unsuccessful students who have previous online experience. Given this information the alternative hypothesis will be accepted and the null hypothesis will be rejected.
Table 15: Successful Completion vs. Not, Prior Enrollment in an Online Course

<table>
<thead>
<tr>
<th>Prior Enrollment in Online Course—Successful Online Course Completion vs. Not</th>
<th>No</th>
<th>Yes</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>2,437</td>
<td>1,815</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>3,164</td>
<td>2,125</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>5,601</td>
<td>3,940</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Reject the null hypothesis, accept the alternative hypothesis, $H_{a1e}$ Prior enrollment in an online course is related to successful online course completion.

$H_{01f}$ Student gender is not related to successful online course completion.

Table 16 shows that significance did exist between genders during the years of this study. Females made up a larger number of total participants, 7,319 compared to 2,222 for males. Interestingly, males were the statistically more significant gender to successfully complete an online course at MOCC, $\chi^2 (1, N = 9,541) = 7.382, p = .007$.

Table 16: Successful Completion vs. Not, Gender

<table>
<thead>
<tr>
<th>Student Gender—Successful Online Course Completion vs. Not</th>
<th>Female</th>
<th>Male</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>3,206</td>
<td>1,046</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>4,113</td>
<td>1,176</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>7,319</td>
<td>2,222</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Reject the null hypothesis, accept the alternative hypothesis, $H_{a1f}$ Student gender is related to successful online course completion.

$H_{01g}$ Student financial assistance is not related to successful online course completion.
Forty-six students separated the successful from unsuccessful when financial assistance was the primary variable. The overwhelming majority of students (7,320 yes, 2,221 no) received financial assistance during the years covered by this study. This high number of students receiving financial assistance is consistent with previous years at MOCC where approximately 80% of students received financial assistance. Statistically, student financial assistance was significant, leading to rejection of the null hypothesis and acceptance of the alternative hypothesis, $\chi^2 (1, N = 9,541) = 420.638, p = .000$ (Table 17).

**Table 17: Successful Completion vs. Not, Financial Assistance**

<table>
<thead>
<tr>
<th>Student Financial Assistance—Successful Online Course Completion vs. Not</th>
<th>No</th>
<th>Yes</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful Completion</td>
<td>569</td>
<td>3,683</td>
<td>4,252</td>
</tr>
<tr>
<td>Non Completion</td>
<td>1,652</td>
<td>3,637</td>
<td>5,289</td>
</tr>
<tr>
<td>Totals</td>
<td>2,221</td>
<td>7,320</td>
<td>9,541</td>
</tr>
</tbody>
</table>

Reject the null hypothesis, accept the alternative hypothesis, $H_{a1g}$ Student financial assistance is related to successful online course completion.

**Section Three: Student Level Factors Relating to Successful Completion**

$H_{01h}$ There is no significant difference in the number of credit hours taken between those successful completing an online course and those that do not.

$H_{01i}$ There is no significant difference in the grade point average between those successfully completing an online course and those that do not.

$H_{01j}$ There is no significant difference in student age between those successfully completing an online course and those that do not.
The final three independent variables were analyzed using a t-test due to the variable being continuous and the same participants took part in each variable. The analysis showed that all three null hypotheses should be rejected and the alternative hypothesis accepted. On average successful online students enrolled in more credit hours (M=10.51, SE=.061) than unsuccessful students (M=7.42, SE=.075), \( t(9539) = -32.09, p<.05 \) (Table 18). Interestingly, both groups of students (successful and unsuccessful) were enrolled at less than full-time status. Enrollment in less than full-time is not uncommon for community college students. Community colleges have a diverse student population with wide ranges in age, remediation and financial assistance which often lead to less than full-time enrollment. It should be noted that successful students were only 1.5 credit hours short of full-time status. A successful online student had a significantly higher GPA (M=3.09, SE=.008) compared to a unsuccessful student (M=2.76, SE=.011), \( t(9539) = -22.57, p<.05 \) (Table 18). A large age range existed between study participants (ages 16-64) but less than one year in age was found between successful (M=30.41, SE=.157) and unsuccessful (M=29.57, SE=.132), \( t(9539) = -4.09, p<.05 \) students, yet the difference was significant (Table 18). Based on the significance of these three variables a successful online student would be a student enrolled in 10.5 credit hours, with a GPA above 3.0 and 30 years old.

**Findings for Sections One, Two and Three**

Table 19 shows the significant variables and acceptance or rejection of variable hypothesis. A singular variable, prior remediation was found to lack significance. This was the only variable requiring the acceptance of the null hypothesis and rejection of the
alternative hypothesis. All remaining variables showed significance when analyzed using chi-square or an independent t-test.

**Table 18: Successful Completion vs. Not, Comparison of Continuous Variables**

<table>
<thead>
<tr>
<th></th>
<th>Successful Completion (n = 4,252)</th>
<th>Non Completion (n = 5,289)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Number of Credit Hours</td>
<td>10.51</td>
<td>3.96</td>
</tr>
<tr>
<td>Grade Point Average</td>
<td>3.09</td>
<td>0.55</td>
</tr>
<tr>
<td>Age</td>
<td>30.41</td>
<td>10.26</td>
</tr>
</tbody>
</table>

Reject the null hypothesis, accept the alternative hypothesis, Ha1h that there is a significant difference in the number of credit hours taken between those successfully completing an online course and those that do not.

Reject the null hypothesis, accept the alternative hypothesis, Ha1i that there is a significant difference in the grade point average between those successfully completing an online course and those that do not.

Reject the null hypothesis, accept the alternative hypothesis, Ha1j that there is a significant different in student age between those successfully completing an online course and those that do not.

**Section Four: Student Level Factors Predicting Successful Completion**

**H02** There are no significant linear relationships that explain the variance between student level factors and successful online course completion.

Logistic regression was the analytical technique used to explain the variance in the linear model. The Enter method was used to force all variables as one block.
simultaneously. Even though the results of sections two and three revealed one variable without a significant difference (prior enrollment remediation), the researcher elected to include all variables including the non-significant, in the event interaction effects were present.

Table 19: Compilation of Differences Associated with Sections Two and Three

<table>
<thead>
<tr>
<th>Test</th>
<th>Variable</th>
<th>Not Significant (Retain Null)</th>
<th>Significant (Accept Alternative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square (Section Two)</td>
<td>College division</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Academic Level</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Academic Semester</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Prior Enrollment, Remediation</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Prior Enrollment, Online Course</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Financial Assistance</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Independent t-test (Section Three)</td>
<td>Credit Hours</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>GPA</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The statistics presented from the Enter method logistic regression include the model summary data, specifically: the model $\chi^2$, Cox & Snell $R^2$, and Nagelkerke $R^2$. The variable statistics, shown via the coefficients from the model, include the standardized beta coefficient ($\beta$), the standard error of the beta, the Wald statistic, the significance of the variable in the model, and the exponentiated beta (Exp(B)).
The results of the logistic regression are presented in Table 20. The model explained approximately 15% to 20% of the variance in successful completion (Cox & Snell $R^2 = .155$; Nagelkerke $R^2 = .210$; $p < .05$).

Research question H$_{02}$ will be rejected and the alternative hypothesis (H$_{a2}$) will be accepted since 10 variables: College division, academic grade, academic term, prior online course, gender, financial assistance, credit hours attempted, GPA and age were all found to have a significant impact on online course completion (Table 20). Some of the significant variables had a strong probability toward successful completion while others had decreasing probability of successful completion. The variables having the highest probability relationship on successful completion were; College division, gender, financial assistance, credit hours attempted, GPA and age. The variables that had a weaker probability to successful completion were academic grade (freshman and sophomore), Academic Term (fall and spring), and prior online course. Additional interpretation is reported in Table 21.
## Table 20: Logistic Regression, Variables and Model Summary

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>β</th>
<th>se</th>
<th>Wald</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College division</td>
<td>.309</td>
<td>.046</td>
<td>45.019</td>
<td>.000*</td>
<td>1.362</td>
</tr>
<tr>
<td>Grade, HS Student</td>
<td>.705</td>
<td>.474</td>
<td>2.214</td>
<td>.137</td>
<td>2.024</td>
</tr>
<tr>
<td>Grade, Freshman</td>
<td>-.677</td>
<td>.084</td>
<td>64.231</td>
<td>.000*</td>
<td>.508</td>
</tr>
<tr>
<td>Grade, Sophomore</td>
<td>-.168</td>
<td>.048</td>
<td>12.061</td>
<td>.001*</td>
<td>.845</td>
</tr>
<tr>
<td>Term, Fall</td>
<td>-.686</td>
<td>.071</td>
<td>92.698</td>
<td>.000*</td>
<td>.504</td>
</tr>
<tr>
<td>Term, Spring</td>
<td>-.360</td>
<td>.073</td>
<td>24.672</td>
<td>.000*</td>
<td>.697</td>
</tr>
<tr>
<td>Prior Remediation Course</td>
<td>-.097</td>
<td>.129</td>
<td>.569</td>
<td>.451</td>
<td>.908</td>
</tr>
<tr>
<td>Prior Online Course</td>
<td>-.121</td>
<td>.048</td>
<td>6.378</td>
<td>.012*</td>
<td>.886</td>
</tr>
<tr>
<td>Gender</td>
<td>.208</td>
<td>.054</td>
<td>14.689</td>
<td>.000*</td>
<td>1.231</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>.177</td>
<td>.069</td>
<td>6.600</td>
<td>.010*</td>
<td>1.194</td>
</tr>
<tr>
<td>Hours Attempted</td>
<td>.136</td>
<td>.007</td>
<td>428.738</td>
<td>.000*</td>
<td>1.146</td>
</tr>
<tr>
<td>GPA</td>
<td>.531</td>
<td>.039</td>
<td>188.684</td>
<td>.000*</td>
<td>1.701</td>
</tr>
<tr>
<td>Age</td>
<td>.009</td>
<td>.002</td>
<td>13.252</td>
<td>.000*</td>
<td>1.009</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.281</td>
<td>.168</td>
<td>381.134</td>
<td>.000</td>
<td>.038</td>
</tr>
</tbody>
</table>

**Model χ² =** 1,611.577 (.000)  
**Cox & Snell R² =** .155  
**Nagelkerke R² =** .208  
**n =** 9,540

* = p<.05

Hₐ₂ There are significant linear relationships that explain the variance between student level factors and successful online course completion.
## Table 21: Additional Interpretation of Logistic Regression with Odds Ratio

<table>
<thead>
<tr>
<th>Significant Variables</th>
<th>Exp (B)</th>
<th>Interpretation</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>College division</td>
<td>1.362</td>
<td>Odd for CTE passing are 36% higher than A&amp;S students</td>
<td>36.20</td>
</tr>
<tr>
<td>Grade, Freshman</td>
<td>0.508</td>
<td>Odds for freshman passing are 49% less than over 75 students</td>
<td>-49.20</td>
</tr>
<tr>
<td>Grade, Sophomore</td>
<td>0.845</td>
<td>Odds for sophomores passing are 15% less than over 75 students</td>
<td>-15.50</td>
</tr>
<tr>
<td>Term, Fall</td>
<td>0.504</td>
<td>Odd of passing in fall are 49% less than in the summer</td>
<td>-49.60</td>
</tr>
<tr>
<td>Term, Spring</td>
<td>0.697</td>
<td>Odds of passing in the spring are 30% less than in the summer</td>
<td>-30.30</td>
</tr>
<tr>
<td>Prior Online Course</td>
<td>0.886</td>
<td>Odds are 11% less if previous online course</td>
<td>-11.40</td>
</tr>
<tr>
<td>Gender</td>
<td>1.231</td>
<td>Odds for males passing are 23% higher than females</td>
<td>23.10</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>1.194</td>
<td>Odds for students on assistance passing are 19% higher than those not on assistance</td>
<td>19.40</td>
</tr>
<tr>
<td>Hours Attempted</td>
<td>1.146</td>
<td>Increasing hours attempted by 1 unit, increases completion by 14%</td>
<td>14.60</td>
</tr>
<tr>
<td>GPA</td>
<td>1.701</td>
<td>Increasing GPA by 1 unit, increases completion by 70%</td>
<td>70.10</td>
</tr>
<tr>
<td>Age</td>
<td>1.009</td>
<td>Increasing Age by 1 unit, increases completion by less than 1%</td>
<td>.90</td>
</tr>
</tbody>
</table>
Summary

The results for chapter four focused on answering the two research questions of this study.

1. RQ1: How do student level factors relate to successful online course completion?
2. RQ2: How do the student level factors predict successful online course completion?

Multiple statistical methods were used ($\chi^2$, t-test and logistic regression) to determine which variables could lead to successful completion in a fully online course. The results from the statistical analysis were similar with only one variable, prior remediation, lacking significance. All other variables were found to be significant by $\chi^2$ / t-test analysis and logistic regression (Table 19). Logistic regression was able to explain 15% - 20% of the variance among data (Table 20) and provide a framework of probabilities that successful online students share common variables from this research (Table 21).

Chapter four outlined the descriptive statistics of all participants in the study followed by the student level factors relating to successful completion. The student level factors were divided into two groups for analysis with College division, academic level, academic semester, prior enrollment in an online course and prior remediation, gender and financial assistance analyzed using a chi-square test. Credit hours, GPA and age were grouped in student level factors part three and an independent t-test was performed. The final section of chapter four were the combined variables from sections two and three which were analyzed using a forced entry logistic regression. All statistical analysis
ONLINE RETENTION

methods resulted in significance of student variables except prior enrollment in a remediation course. Chapter five will discuss the individual student level variables finding from chapter four with support from previous literature.
Chapter five will discuss the findings of the study that were presented in chapter four. The chapter will be divided into five sections: statement of problem, summary of methods, findings from research questions, further research and finally a summary. Online courses are becoming a larger part of the academic landscape. Enrollments in online courses are increasing across the nation at all types and sizes of colleges. As discussed in chapter 2, research has shown that the increase in enrollment has ranged from 11% to as much as 24% (Lokken, 2009; Bersin, 2005; Gleason, 2004). Online courses tend to be an educational equalizer for students that come from disadvantaged backgrounds. High numbers of non-traditional students who have active lifestyles and outside classroom factors that play important roles in completion are increasing enrolling in online courses. The problem with the increase in enrollment and easy access to college course work is that nationally 50% of those students that enroll in online courses do not successfully complete the course. Community colleges are the perfect microcosm for students to lack success in online courses. Community college offer easy enrollment to students which helps non-traditional and the disadvantaged student access higher education which has lead to the highest enrollment in online courses nationally. Large increases in students enrollment at community colleges sounds great in a time of declining enrollment nationally, but it comes with a price, decreased successful completion.
ONLINE RETENTION

Summary of Methods

The purpose of this study was to determine if 11 variables (10 independent and 1 dependent) share a relationship in determining successful completion of online coursework. The study used de-identified archived data from one community college in Missouri. The data set covered academic years fall 2010 – summer 2012. The study had 9,542 participants who enrolled in 130 online courses over the semesters of the study. The data was analyzed using chi-square to analyze the categorical and dichotomous variables (Table 22). An independent t-test was used on the continuous variables. Once significance of the 10 independent variables was determined a logistic regression analysis was used to determine which variables had the strongest probability of predicting successful completion in online courses at MOCC.

The research questions guiding this study are:

1. How do student level factors relate to successful online course completion?
   a. \(H_{01a}\) College division is not related to successful online course completion.
   b. \(H_{01b}\) Academic level is not related to successful online course completion.
   c. \(H_{01c}\) Academic semester is not related to successful online course completion.
   d. \(H_{01d}\) Prior enrollment in remediation course(s) is not related to successful online course completion.
e. \( H_{0le} \) Prior enrollment in an online course is not related to successful online course completion.

f. \( H_{0lf} \) Student gender is not related to successful online course completion.

g. \( H_{0lg} \) Student financial assistance is not related to successful online course completion.

h. \( H_{0lh} \) There is no significant difference in the number of credit hours taken between those successfully completing an online course and those that do not.

i. \( H_{0li} \) There is no significant difference in the grade point average between those successfully completing an online course and those that do not.

j. \( H_{0lj} \) There is no significant different in student age between those successfully completing an online course and those that do not.

2. How do the student level factors predict successful online course completion?
   a. \( H_{02} \) There are no significant linear relationships that explain the variance between student level factors and successful online course completion.

   b. \( H_{a2} \) There are significant linear relationships that explain the variance between student level factors and successful online course completion.
Findings from Research Questions

Arts & Sciences (AS) / Career & Tech (CT) (College division Variable)

The findings in chapter four showed that a significant number of Arts and Science degree seeking students were less likely to successfully complete an online course compared to students pursuing a Career & Technical degree. These findings were consistent with the findings of Berling (2010) who found more STEM and health and human services students performed better than non-STEM and health services students in online courses. Additional researchers corroborate these study findings. Online course are easily forgotten by students or left until the last minute. One explanation for the CT students increased performance compared to AS students in this study could be due to the purposeful nature of the course material. This explanation agrees with Park and Choi (2009); Levy (2007) and Doo & Kim (2000) who all found that the students satisfaction with online courses increase with the relevance of the course material to the College division.
### Table 22: Explanation of Variables with Statistical Analysis Method

<table>
<thead>
<tr>
<th>Variables</th>
<th>Variable Type</th>
<th>Statistical Method</th>
<th>Indicator Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td></td>
<td></td>
<td>Examples include, but not limited to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Arts &amp; Sciences, Career &amp; Tech</td>
</tr>
<tr>
<td>College Division</td>
<td>Dichotomous</td>
<td>Chi-square</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Continuous</td>
<td>T-Test</td>
<td>16+ (group)</td>
</tr>
<tr>
<td>Gender</td>
<td>Dichotomous</td>
<td>Chi-square</td>
<td>Male, Female</td>
</tr>
<tr>
<td>Academic Grade</td>
<td>Categorical</td>
<td>Chi-square</td>
<td>Freshman, Sophomore, Sophomore-Advanced</td>
</tr>
<tr>
<td>Prior Remediation course(s)</td>
<td>Dichotomous</td>
<td>Chi-square</td>
<td>Yes, No</td>
</tr>
<tr>
<td>GPA</td>
<td>Continuous</td>
<td>T-Test</td>
<td>0.0-4.0 (group, regression)</td>
</tr>
<tr>
<td>Financial Assistance</td>
<td>Dichotomous</td>
<td>Chi-square</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Hours Attempted</td>
<td>Continuous</td>
<td>T-Test</td>
<td>1-24 (group, regression)</td>
</tr>
<tr>
<td>Prior online courses</td>
<td>Dichotomous</td>
<td>Chi-square</td>
<td>Yes, No</td>
</tr>
<tr>
<td>Semester</td>
<td>Categorical</td>
<td>Chi-square</td>
<td>FA10, SP11, SU11, FA11, SP12, SU12</td>
</tr>
<tr>
<td>Successful completion of online course</td>
<td>Dichotomous</td>
<td>Logistic Regression</td>
<td>Yes, No</td>
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Most all theories about the difference between degree plans centers on goal commitment and the students ability to choose a degree plan that fits them and their long-term career goals (Tinto, 1993). MOCC would appear to fit this model. Students in the MOCC AS programs are given an overwhelming number of courses to pick from to meet stated degree requirements. This huge number of courses can seem positive but studies show students that pick course related to long term career goals and stated declared majors are 22% more likely to complete required coursework (Kreysa, 2006; Willcoxson
CT student degree plans at MOCC tend to have clearly defined rigid degree requirements with two-thirds of the courses focusing specifically on career skills. CT degree plans are contrasted with the AS degree plans which have few clear courses. Most coursework in AS degrees is generic leaving the student to self select courses they think will interest or relate to a career goal, if they have even selected a career goal at the time of enrollment. This study appears to support the goal commitment theory and previous literature covered in chapter two. It appears a relationship exists between goal commitment, stated clear degree plans and CT student’s motivation to complete academic coursework based on this study’s findings and an increasing 36% probability that CT students will succeed compared to AS students. Based on the logistic regression findings, degree plan was the second highest probability of successful online course completion.

**Academic level and Academic Semester**

The academic level and academic semester variables both showed significance. The findings showed that first semester freshman were the least likely to successfully complete their online coursework. Fall and spring semesters were also found to have the lowest potential for online course completion compared to summer semester students. Focusing only on academic level showed that freshman were less successful than sophomores. Sophomores and freshman were 49% less likely to successfully complete than the special students with over 75 completed credit hours. Summer enrollment would have the best chance of successful completion.
One of the theories for reduced first semester freshman success is that they have limited college experiences with independent learning styles and computer technology (Henson, 2013; Allen & Seamon, 2008). The lack of college experience seems to fit with this research study since the students with over 75 earned credit hours performed better than all other academic levels. This would appear to correlate with increasing earned credit hours research (Berling, 2010; Allen & Seamon, 2008). To earn 75 credit hours would require multiple academic semesters to be completed, thus removing the student further from first semester fall enrollment. Additionally, freshman students are viewed as digitally inferior or ‘digital naiveté’ which also leads to reduced online success (Henson, 2013). The limited learning styles of freshman students and reduced online course skills appear to be two variables related to online course completion supported by this study and Nora, Barlow and Crisp, (2005) and Muse, (2003). These findings are important since reports show that community college students are being introduced to online courses earlier than their university counterparts and 60% of community college students have taken at least one online course (Pearson Foundation, 2011; U.S. Department of Education, 2009).

**Prior enrollment in an online course**

The available data appears to point to previous online course experience, independent of successful or unsuccessful outcome, giving students a better chance of success in the current online course (Henson, 2013; Haverila, 2011). Hachey, Wladis & Conway (2012) also found past online coursework to forecast future success. What was also found was that students with no prior online experience had reduced retention and
success rates. The final finding to Hachey, Wladis & Conway (2012) was that students with limited previous online experience did see success as the GPA variable was applied to the interaction. As the no previous online experience student’s GPA increases then online success increases, but if a student has previous online success then the GPA interaction is flat.

The previous research shows the importance of GPA and previous online coursework but most work on gender suggest that females perform better than men in online courses. On the MOCC campus the opposite findings were reported. Significance did exist with students with previous online course experience performing better than those without previous experience. In a contradictory finding, men were found to perform slightly better than women when a chi-square analysis was calculated. When the logistic regression was used in the forced method, previous online experience was also significant but, the directionality of the significance was negative instead of the anticipated positive probability. The negative direction of the significance means that students with previous online course experience had an 11% lower probability of successful completion compared to students with no previous online experience. This could be an interaction effect between variables since women made up slightly more than three times more study participants than men and limited numbers of students requiring remediation enrolled in online courses. More research needs to be done on this interaction effect in the future to find what variable or whether enrollment size could be influencing the outcomes.
Gender

The findings at MOCC regarding gender were contrary to much of the available data relative to online coursework. The statistical results from MOCC showed that men were actually 23% more likely to successfully complete an online course when compared to women. This is in direct contrast to research by Foote (2009), Friday, et. al. (2006), Hartman, Dziuban, Moskal (2000), who all found that women were more successful than men in online courses. Additional work has found small differences between genders such as Martin (1990) who found a 1% difference between genders with women slightly edging men. Argon & Johnson (2008) also found a 14% difference between genders with women succeeding more than men, while Doherty (2006) found women 6% more likely to succeed compared to men.

Researchers have found no difference between genders, or that women drop courses at higher rates than men, but the findings at MOCC are clearly in contrast to the available research (Park and Choi, 2009; Kemp, 2002; Wojciechoswski & Palmer, 2005; Berling, 2010; Sydow and Sandel, 1996). The findings of this present study are important to consider since nationally 56% of all undergraduate enrollments are women which is consistent with the most recent MOCC enrollment statistics. Further research needs to be done to determine why women at MOCC have an increased chance of dropping online courses compared to men when women out-number men on the MOCC campus and enroll in more online courses.
Student financial assistance

Many factors limit the success of online students such as time, family and financial constraints. Financial considerations are one of the variables that can be reduced or eased for students. MOCC had nearly 80% of enrolled students qualify for some type of financial assistance. This high percentage of qualification appears to be a contributing factor for online success according to current study findings. This study found a 19% increase in successful completion for students that received financial assistance. This significant finding is supported by Fike and Fike (2008), Kirby, White & Aruguete, (2007), Terenzizi et. al., (2001), and Bertling (2010) who all found a relationship between successful course completion and financial assistance.

Financial aid is often used as a predictor of socioeconomics and this study is no different. It is important to mention one more time, that 80% of all students at MOCC, and 76% of online students receive some type of financial assistance. This appears to indicate students at MOCC come from an economically disadvantaged area so the study findings would support previous works that economically disadvantaged students persist longer when they receive financial aid. Terenzina et. al., (2001), Wessel, et. al., (2006), Zhai and Monzon (2001) found that the lowest income students, often at community colleges with the greatest economic need, increased persistence with financial aid as the best predictor of success.

Credit Hours, Grade Point Average (GPA), Age

Credit hours attempted per semester is an area of mixed results. The findings from this study showed that successful students enrolled in 10.5 credit hours per semester
while those unsuccessful students were enrolled in 7 credit hours. The average student at MOCC enrolled in 11 credit hours, only .5 less that a successful online student. The findings of Doherty (2006) state that the more credit hours a student was enrolled in the more successful the student was in passing online courses. Muse (2003) reported that increasing numbers of credit hours and freshman status resulted in less online success. The interaction of the credit hours and academic grade could be the result of freshman having limited college experience to draw from. The finding that successful student were enrolled in less than full-time status is not surprising since 44% of MOCC students are enrolled as part-time students. This trend is seen nationally with up to two-thirds of community college students attending on a part-time basis (Powers, 2007). The predictive nature of the logistic regression showed that as credit hours attempted were increased by 1 unit from 7 credits hours to 10.5 credit hours the potential successful completion rate increased by 14%.

Successful online students had a significantly higher GPA, 3.09, compared to an unsuccessful student with a GPA of 2.76. GPA also showed the greatest probability to predict online course success. As GPA was raised one unit the probability of success was increased by 70% in this study. Based on the findings at MOCC, GPA was the best predictor of online course success. This finding is not new to online or traditional classrooms. Beginning three decades ago, researchers reported that GPA was one of the most important factors to predict college distance education success (Billings, 1988; Astin, 1993). Since that time, Muse (2003); Wojciechowski & Palmer (2005); Berling (2010) have confirmed GPA as a primary predictor of online success. Interestingly, the
GPA for both successful (3.09) and unsuccessful (2.79) online students at MOCC were higher than some other institutions in similar studies. At Tidewater Community College (2001) students with GPA less than 2.0 were less likely to complete online classes while students with GPA ranging from 2.0-3.0 showed an equal chance of successful completion. Another study reported students with a GPA at 2.47 or above was most likely to successfully complete online coursework (Argon & Johnson, 2008). Even with the GPA at MOCC remaining higher than other institutions the connection between higher GPA and successful completion was true. The higher GPA students were also found to have increased success in studies of community colleges in Virginia and Washington according to Jaggers & Xu (2010) and Xu & Jaggers (2013). Figlio, Rush and Yin (2010) support the linear idea that the higher the GPA the greater the chance of online success.

Credit hours and GPA exhibited straightforward findings; the more credit hours a student took up to 10.5 and the higher the GPA (up to 3.09), the increasing likelihood a student would successfully complete an online course. When a social variable, age, is introduced the findings were also significant. Successful students at MOCC had an age of 30.4 years compared to unsuccessful students whose age was 29.5. It should be noted that both categories of successful and unsuccessful students are categorized as non-traditional students. Both successful and unsuccessful student ages were higher than those of the average MOCC student who had an average age of 25, still in the non-traditional category. The ages of students found for success or no success at MOCC support research that students in online courses tend to be non-traditional in age
(Doherty, 2006; Berling, 2010). Research by Wojciecowski and Palmer (2005) found a close relationship to a student age of 25 and success. The age of 25 was older than previous studies; this current study would be one of them.

Additional findings supported are that non-traditional students tend to be older, have higher GPA, and enroll in fewer credit hours (less than full-time status) with more previous earned credit hours. The interaction between GPA, credit hours and age has been shown to be closely linked variables (Diaz, 2000a; Moore and Kearsely, 1996). A theory has been put forward that older students have numerous life commitments from family to work which limit their ability to enroll in full-time status. The life pressures surrounding older students also gives them life experience that is used to determine when the ‘best’ time is to drop an online course. It is believed that older students drop course(s) prior to receiving a failing grade which allows them to maintain higher GPA and remain on financial aid further reducing academic stress. Overall, the results from MOCC predicted a slightly less than 1% increase in success for every 1 unit of age increase.

Further Research

The continued discovery of the variables that predict future success in online courses specifically at community colleges is important. As students continue to move to an electronic learning model what technology skills they possess are important. Additionally, researchers should look into the gender differences, financial aid and credit hours per semester questions. The area of greatest interest from this study is why women
performed with less success compared to men. Is this specific to MOCC or could the increased enrollment of women at community colleges be altering data outcomes for both genders? Future researchers could use logistic regression analysis but study fewer variables with each statistical analysis to better understand the interaction between variables. The forced entry method on this study design could have allowed some variable interactions to be overshadowed by other variables. It could also be helpful to perform a qualitative analysis of students that were both successful and unsuccessful to determine if life experiences due to overbooking are overriding all computable available data.

Limitations of study

This study only covered archived undergraduate online courses at one community college in Missouri over two academic years (2010-2012). The archived data only allowed the research access to data that could be electronically harvested. An example of limited but necessary data was financial assistance. The researcher was unable to determine if the financial assistance was from student loans, scholarships or grants. The study also was not able to obtain GPA of first semester freshman prior to enrollment. These students GPA would not have become relevant in the study until their second college semester.

Online courses were taught at freshmen and sophomore college levels numbered 0095-2999. There was no delineation between courses that were required for particular degree completion or elective credit. Additionally, remediation courses were not delineated from non-remediation courses. Average drop rates for courses were also not...
considered. This study did not attempt to correlate positive completion in the online learning environment with degree completion nor future success in higher education. This study was done using quantitative research methods only with data harvest from archival de-identified data. Using quantitative data did not allow for student personality, learning style or opinion toward the instructor as factors.

This study did not consider instructional design, faculty expertise or experience. Course interaction between student and instructor was also not a factor in data analysis. Additionally, special accommodations for underserved educational population’s access to online courses at MOCC were also not considered. The study treated all online courses as equal by default treating all instructor’s teaching techniques and methods as equivalent. This study also presumes that all students had equal desire to enroll in the course that was under analysis. Finally, the study only considered students enrolled at MOCC during the study years. Students could have taken online courses or remediation courses at institutions prior to MOCC. Despite the study limitations significant outcome variables were determined that can be used to aid in student enrollment of online courses.

**Implications for policy and practice**

Students taking online courses have a role in their education. Unfortunately, many students choose online courses because they are perceived to be easier or less intense and can be done anytime with limited external resources. Students also incorrectly assume that the learning styles needed to be successful in online courses are the same as those in a traditional classroom where students tend to be lead by the instructor. With this information it would be worthwhile to have an online ‘contract’ or
document of understanding alerting potential students to the rigors and technology demands for online courses. This would allow students to make more informed decisions before enrolling in an online course. Once enrolled, having students participate in a mandatory online course orientation should allow the student to focus on course content and less on the courses technical mechanics.

Additional training for advisors to better understand the types of students that have been proven to be successful in online courses should be started immediately. One place to start would be for similar community colleges to use this research study as a training resource to better educate advisors about variables successful students share. Advisors should also focus available advising time on at risk students during advising sessions. This would hopefully lead to more informed decision making by both advisors and students about online course enrollment. If necessary, advisors should limit enrollment to those with variables that show a correlation to successful course completion.

Institutionally, colleges should increase computer resources prior to enrollment in online course. Colleges should make sure that technological resources are available and up to date at all campus locations with a wide range of access times. Institutions should also focus on student and advisor training to educate both about the positives and negatives of online education. Based on the findings of this study administrators should consider reducing or limiting the ability of first semester freshman to take online courses. Colleges should investigate their institutions to determine if they also have increased success rates in the summer and spring semesters. If so, then promoting enrollment in
times of increased success would be appropriate. Focusing on career and technology students appears to be a good first step toward increasing student success. In this study, online students in the career based fields outperformed their counterparts from arts and sciences. This seems to follow the theory that students with clear professional goals are more focused on successful completion. The final policy change would require online faculty to continually promote course communication between instructors and students. This study did not focus on course design but online courses require higher levels of learning by their nature. The more involved instructors are in the course the better they are able to monitor and lead discussion. This engagement would allow faculty to identify struggling students or adjust courses to fit the profiles of the students they are leading.

Summary

The findings from this study support previous research that GPA is the most significant factor in determining online course success. Numerous other variables such as College division, gender, credit hours enrolled, financial assistance and age played important roles in determining which variables could potentially lead to a successful online student at MOCC. The importance of understanding the predictor variables is necessary since the majority of students taking online courses do so at community colleges especially if the student is from a disadvantaged background. Often the disadvantaged student’s first experience with higher education comes in the form of online courses at community colleges. Previous research supported by this study showed
that online students tend to be older, have higher GPA, have more previous earned credit hours and also are enrolled at a part-time student. Findings unique to this study were that Career and Technology students performed better in the online environment compared to the liberal Arts & Sciences students. Also it was found that men out performed women over the two academic years covered. The gender finding is unique since more previous research found no gender differences or women out performing men.

With the increasing roll technology plays in our daily lives, students of all ages appear to be moving toward distance education. This is clear for the previously mentioned disadvantaged student and community colleges. Armed with the enrollment increases, higher education must find a way to reduce the enrollment losses. Nationally, data suggest that as much as 50% of the students that enroll in an online course, fail, are dropped by the instructor or withdraw from the course. Funding for higher education is dwindling as a percentage of state appropriations which means colleges cannot afford to lose students from their institutions. That is why understanding what common variables all students share that can best predict future online course success is important. This information would allow the student, academic advisor and institution to best position the student for success in the online environment or the traditional classroom depending on the predictor variables.

Based on the findings of this study the outline of a successful student in the online environment at MOCC would follow this format in order of highest predictability: GPA of 3.0 or higher, enrolled in a Career and Technology field of study, male, receiving
financial aid, enrolled in 10.5 credit hours and an age of 30. The most likely semester for success would be the summer semester.


Willis, B. (1992). Effective distance education: A primer for faculty and administrators (Monograph Series in Distance Education, No. 2) Fairbanks: University of Alaska State Wide


VITA

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