Learner Characteristics as Early Predictor of Persistence in Online Courses

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Dedication

I dedicate this dissertation to my parents, Abdul Malik Asdi (late) and Shahnaz Anwar, for their unconditional love, support, and sacrifice.

Abstract

The purpose of this study was to examine how learner characteristics could be used to predict whether or not a college learner would persist in the first online course and, more importantly, enroll in the next two terms. The four learner characteristics examined were learners' pre-course basic verbal score, college application score, degree level, and start date. The data were collected from 2,674 learners who were enrolled in one of the online public service and health graduate programs at a large Midwestern university. A quantitative study was conducted to investigate the research questions. The chi-square test of association, a nonparametric statistical test, was used to determine if there were any significant differences between variables of the data. The following descriptive statistics were used to describe the data: frequency distributions, means, standard deviations, and percentages. Stepwise logistic regression was used to understand whether learner persistence can be predicted based on a learner's pre-course basic verbal score, application score, degree level, and start date.

The tests results revealed a statistically significant difference between learners who completed their first course and learners who dropped out of their first course with respect to pre-course basic verbal, application score, and degree level. There was no statistically significant difference between the two groups with respect to start date. The logistic regression model was found to be statistically significant ($p < .0005$); however, the model explained only 1.7% of the variance in learner persistence; hence, this model needs to be used with caution. Of the four independent variables, only application score ($p < .0005$) added significantly to the model. This study supports the idea that learners

who have higher application scores are more likely to complete the first course and enroll in the next two terms.

The findings of this study can contribute to the scholarly work in the field and potentially provide the base for future interventions to improve learner persistence in the first online course and enrollment in the next two terms.

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Chapter 1

Introduction

For four-year colleges and universities, whether public or private, 38% of those who

leave will do so in their first year, and 29% in their second year.

— Vincent Tinto, *Completing College: Rethinking Institutional Action* (2012)

Online college enrollments have continued to grow faster than the total population

of college learners over the last decade (Christensen, Horn, Caldera, & Soares, 2011).

The percentage of learners who took at least one online course grew from 10% in 2003 to

an all-time high of 33.5% in the fall of 2013 (Allen & Seaman, 2014). While the

enrollment in online education is growing rapidly, learner dropout remains a problem

faced by many educational institutions (Bowden, 2008; Tello, 2007). Usually, a learner's

decision to drop a course is not indicative of academic non-success and is more a

reflection of a lack of persistence (Park & Choi, 2009).

Although several studies have been published indicating much higher dropout

rates in online programs as compared to face-to-face programs (Holder, 2007; Lee &

Choi, 2011; Moore & Hart, 2004; Patterson & McFadden, 2009; Rovai, 2003), little is

known about how to identify the characteristics of a learner who is at risk of dropping an

online course (Liu, Gomez, & Yen, 2009; Harrell & Bower, 2011; Kerr, Rynearson, &

Kerr, 2006). Dropout rates in online courses should be evaluated carefully, as the learner

characteristics for online courses are different from those of the traditional classroom.

Online learners are usually older and have some factors that prohibit them from taking

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traditional courses, such as conflicts due to increased family and work responsibilities (Allen & Seaman, 2014). Studies have found mixed results for significant factors related to online course persistence, and little is known about online learner characteristics as a predictor of success in online courses (Hart, 2012). This study was designed to examine what learner characteristics could be used to predict learners' persistence to complete their first online course and, more importantly, enrollment in the next two terms.

This chapter provides the background and context of the proposed study, which analyzes learner characteristics and their relationship to the persistence of learners in online courses. The conceptual framework that guided the study is presented, along with an explanation of the variables included in the framework. In addition, the research questions of the study are provided.

Background, Context, and Conceptual Framework

The National Center for Education Statistics (2012) reported that in the 2010–2011 academic year, more than 62% of 4- and 2-year Title IV institutions offered some type of online course. With the increase in online education, the issue of learner persistence has emerged as one of the major concerns for any institution providing online courses. Several studies have shown that dropout rates are often higher for online courses than for similar traditional face-to-face courses (Xu & Jaggars, 2014; Holder, 2007; Tinto, 2006).

An attempt must be made to gain a better understanding of why online courses have higher dropout rates as compared to traditional face-to-face courses at some higher education institutions (Lee & Choi, 2011; Moore & Hart, 2004; Patterson & McFadden,

2009). Parsad and Lewis (2008) pointed out that the online environment is attractive to many learners because of its accessibility. The authors noted that, for some learners, the online environment is their only pathway to higher education, and for all online learners, it offers the advantage of flexibility and choice as to the time and place of the educational experience. Despite these advantages, however, if learners do not persist in online courses, they are not able to benefit from what the online environment has to offer.

The Historical Context of Distance Education

Moore and Kearsley (2012) defined distance education as "a planned teaching and learning process in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organization" (p. 2). Carey (2000) said that distance education is "characterized by a quasi-permanent separation of teacher and learner throughout the learning process" (p. 2). Schlosser and Simonson (2009) would add that recent distance education is defined by interactive computer mediated communication technologies that are used to connect learner to teacher, learner to learner, and learner to content and resources. Moore and Kearsley might supplement these definitions by saying that distance education is distinguished by its use of purposeful course design using technical media to deliver content, as well as its attention to supporting two-way communication between instructors and learners.
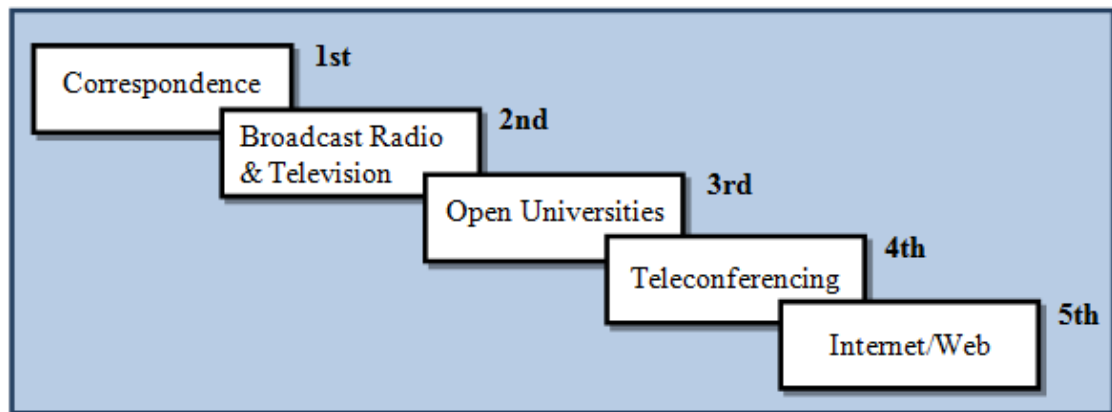
Figure 1.1. Five generations of distance education (Moore & Kearsley, 2012).

Moore and Kearsley (2012) noted that although some people think distance education started with the invention of Internet technology, as it is currently being adopted by a majority of educational institutions, distance education is not a new phenomenon in America. The authors divided the evolution of distance education into five historical generations (illustrated in Figure 1.1):

1. First generation: correspondence study. Also known as "home study" and "independent study." The history of distance education begins with instruction delivered through the use of postal services. The first record of a systematic distance education course is a correspondence lesson in shorthand offered by Caleb Phillips through the use of the United States Postal Service in 1728. Due to cheap and reliable postal services, distance education expanded throughout the eighteenth and nineteenth centuries. From 1883 to 1891, learners could earn 4-year academic degrees from Chautauqua College of Liberal Arts (New York) by completing a correspondence course of readings to supplement the summer schools (Moore &

Kearsley, 2012; Simonson, Smaldino, Albright, & Zvacek, 2009).

2. Second generation: broadcast radio and television. In the early twentieth century, radio became the primary mode of distance instructional delivery. In 1921, the first educational radio license was issued to Latter Day Saints' University (Salt Lake City). Other pioneer university radio stations included station WHA at the University of Wisconsin, WLB at the University of Minnesota, KOAC at Oregon Agricultural College, and WRM at the University of Illinois (Moore & Kearsley, 2012). Educational television began to develop soon after the advent of radio. As early as 1934, the State University of Iowa presented television broadcasts on subjects like oral hygiene and astronomy (Unwin & McAleese, 1988). The addition of audiovisual media made the learning more appealing than textbooks alone. Moore and Kearsley reported that instructional TV had grown by the late 1970s to include 150 educational stations, serving all levels, from primary through postsecondary.

3. Third generation: open universities. In late 1960s and early 1970s, two important experiments took place in furtherance of ways to organize technologies and human resources to create new instructional techniques and educational theories (Moore & Kearsley, 2012). In 1964, the Carnegie Corporation funded an experiment called the Articulated Instructional Media program (AIM) to test the idea of joining and incorporating various communication technologies to offer distance education. Using a systems approach to distance education based on the AIM model, in 1969 the British government funded an experiment to create a fully autonomous institution called the Open University UK. Later, Open University emerged as a world-class

institution, and the Open University model was widely adopted by other countries for distance education (Moore & Kearsley, 2012).

4. Fourth generation: teleconferencing. Moore and Kearsley (2012) discussed the impact of satellite technology on distance education. The Early Bird, the first commercial communications satellite, was launched in 1965. In 1974, the world's first educational use of satellite technology started with the launch of the ATS-6 satellite. This early service was inefficient and expensive; however, in the 1990s the new direct broadcast satellite (DBS) technology allowed individuals to receive an educational program sent directly to them, according to Moore & Kearsley. Simonson et al. (2009) noted that in the late 1980s and early 1990s, satellite and fiber-optic technology provided opportunities for real-time interaction among distance learners and their instructors, in teleconference courses delivered by telephone, satellite, cable, and computer networks.

5. Fifth generation: Internet/web. In 1989, the World Wide Web was invented by scientists at CERN, the European Organization for Nuclear Research (Leiner et al., 2009). The goal was to share information among researchers. Since the mid-1990s, the Internet has emerged as the primary medium for delivery of instruction at a distance. This involves teaching and learning in "virtual" classes and universities. Broadband, wireless, streaming media, voice recognition, and the growth of new Internet applications have the potential to transform learning and the learning experience. Moore and Kearsley (2012) stated that many teaching methods have been refined through all generations of distance education and are transferable to the

current generation. They discussed the many challenges that online learning

providers have faced in previous generations.

Bower and Hardy (2004) affirmed that the educational community has embraced distance

education since the Internet emerged in the 1980s, and noted that institutions have

increased their offerings of distance programs for a number of different reasons. First,

online education enables access to postsecondary educational opportunities for otherwise

underserved populations, including rural residents, working parents, and those with

disabilities that keep them from physical participation at a traditional campus. Greater

numbers of good learning outcomes can be achieved through the increases in educational

accessibility available through online learning, particularly its more flexible format that

overcomes limitations of location and schedule. Second, the authors found that

postsecondary institutions that offer additional courses online can generate increased

revenue without spending money on the construction of new buildings. The National

Center of Education Statistics (2012) reported that in the 2010–2011 academic year, more

than 62% of 4- and 2-year Title IV institutions offered some type of online course.

Many authors have discussed the increasing use of online education and the

debates that have emerged concerning its effectiveness (Kaupp, 2012; Means, Toyama,

Murphy, Bakia, & Jones, 2010; Smith Jaggars & Bailey, 2010; Xu & Smith Jaggars,

2013). Means et al. observed that much recent research has been conducted to scrutinize

the various aspects of online learning, as would be expected with any pedagogical

innovation. Moore and Kearsley (2012) reported that topics have included whether or not

the online environment is more or less effective at producing learning for certain course

subjects or types of learners, or whether there are sufficient media and technological resources to support the online learning process.

Many of the researchers have attempted to determine whether online distance education is as effective as traditional education (Allen & Seaman, 2013; Jones, 2013; Kaupp, 2012; Means et al., 2010; Smith Jaggars & Bailey, 2010; Xu & Smith Jaggars, 2013). These researchers found that in comparisons of learner outcomes between traditional and online learners, specifically academic achievement, the majority of the research suggested that the learning outcomes for Internet technology are comparable to those for traditional classroom formats.

A recent article by Cook (2014) critically appraised the value of online learning and stated, "Online learning is not cheap, is not inherently more effective or more efficient than face-to-face learning, and will not (by itself) transform education" (p. 1). The article suggested pausing, reflecting, and reconsidering the value of online learning before embracing the high-tech, high-cost online learning products. The author did acknowledge the great value in the flexibility, control, and data analytics offered by online technology, and suggested that online learning is an instructionally sound approach that is "low-cost, low-tech [and will] cause a disruptive innovation that will soon replace high-tech, high-cost online learning products" (p. 1).

Context of the Study

Hart (2012) noted that persistence is a complex phenomenon that, in online education, equates to success and completion of an online course. She found that studies that have examined the persistence of learners in online settings have produced mixed

findings in identifying the variables that have an impact on whether or not these learners persist. However, she reported that some variables have consistently been found to have either a positive or negative effect on learner persistence (i.e., learning style, basic computer skills, college status and graduating term, computer access, isolation, and decreased engagement).

The variables for the current study were chosen because they have previously been found to have some influence on learners' persistence in online courses. Some of the variables will have a greater impact on learners' persistence than others (Aragon & Johnson, 2008; Bowden, 2008; Bunn, 2004; Harrell & Bower, 2011; Holder, 2007; Ojokheta, 2011; Park & Choi, 2009). Due to the mixed findings of previous researchers, the degree of the influence that these variables have on persistence of online learners is not clear. The analysis of the data for this study will identify how each of the variables independently influence persistence, as well as determine the combinations of these variables that can be used to best predict learners' persistence in online courses.

Problem Statement

Many researchers (Allen & Seaman, 2013; Aragon & Johnson, 2008; Bowden, 2008; Bunn, 2004; Harrell & Bower, 2011; Holder, 2007; Ojokheta, 2011; Park & Choi, 2009; Schreck, 2004) have stated that persistence in online courses is increasingly important to higher education providers as their online programs continue to grow. This research has yielded consistent results as far as learner persistence is concerned. Schreck found that online persistence rates were 16% lower than face-to-face persistence rates. McCracken (2009) reported that dropout rates of online courses were 20% to 80% higher

than for similar traditional face-to-face courses. Allen and Seaman (2013) reported that although a large majority of the academic leaders rated the learning outcomes in online learning as the same or better to those in face-to-face, perception of a majority is that lower persistence rates for online courses remain a barrier to the growth of online education. Because of inconclusive data on persistence for online courses, the issue continues to be of importance.

Kerr et al. (2006) reported that the majority of the research on online learning consists of personal summaries of experiences teaching online. The authors found that several questions remain to be answered: For whom is online learning best suited? What learner characteristics are important in the online classroom? What abilities are required for online success, and can they be learned? Hart (2012) observed that ways to identify which learners are most likely to drop an online course are not yet well known, and that this is an important area for further research.

Research Questions

This study was designed to identify learners at risk of dropping online courses and provide possible interventions to improve learner persistence in the first online course and enrollment in the next two terms. This study answered the following questions:

1.   What is the significant difference between the characteristics of learners who persist in their first course and learners who drop out of their first course with respect to:

     a.   the learner's pre-course basic verbal score

     b.   the learner's college application score

c. the learner's degree level

d. the learner's start date.

2. What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first course and enrollment in the next two terms?

Rationale, Relevance, and Significance

Allen and Seaman (2014), in their discussion of learner persistence, stated that this is a long-term goal for both online and brick-and-mortar academic institutions. The authors predicted that within the next five years, more than 50% of learners will take at least one online course. They also noted that concern about learner persistence in online courses is increasing among academic and administrative leaders. They reported that the number of leaders who are concerned about learner persistence increased from 28% in 2009 to more than 40% in 2013. The consequences of learner dropout are significant for learners as well as for academic and administrative staff.

Persistence has been associated with learner success in online courses where success is defined as completion of the course (Bunn, 2004). Oftentimes unrelated to knowledge, persistence enhances a learner's ability to complete an online course successfully (Park & Choi, 2009). Early identification of the learner who may not succeed in an online course can allow interventions by the educator to strengthen learner persistence.

This study provides information about factors related to learner persistence and assists in identification of learners at risk of dropping out of online classes, development

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of possible intervention measures, and resource allocation. It expands on the literature

related to learner persistence in online classes. By investigating online learners, this

study may help educators better understand factors related to persistence of these

learners. The results of this study are expected to inform educational institutions in the

areas of enrollment counseling, academic advising, instructional design, and faculty

development to improve learner persistence in online courses.

Summary of the Study

This study examined which combination of learner characteristics could be used

to predict the persistence of college learners in the first online course and enrollment in

the next two terms. The research questions for this study include:

1. What is the significant difference between the characteristics of learners who

    persist in their first course and learners who drop out of their first course with

    respect to:

    a. the learner's pre-course basic verbal score

    b. the learner's college application score

    c. the learner's degree level

    d. the learner's start date.

2. What is the relationship between learner characteristics (pre-course basic verbal

    score, application score, degree level, and start date) and persistence in the first

    course and enrollment in the next two terms?

The following descriptive statistics were used to describe the data: frequency

distributions, means, standard deviations, and percentages. To address the first research

question, the chi-square test of association, a nonparametric test, was used to discover if there is a relationship between two categorical variables (Airasian & Gay, 2003; Creswell, 2014).

A correlational research design was used to answer the second research question. A correlational research design was chosen since the purpose of this study was to predict the persistence of learners in the first online course and enrollment in the next two terms (Airasian & Gay, 2003; Creswell, 2014).

The retrieved data were displayed in Microsoft Excel spreadsheets. The researcher exported the dataset into the Statistical Package for the Social Sciences (SPSS) for analysis.

Chi-square, a nonparametric statistical test, was used to analyze whether or not there was a relationship between the learner persistence in the first course and the four characteristics of learners.

Using SPSS, the following descriptive statistics were used to describe the data: frequency distributions, means, standard deviations, and percentages. Stepwise logistic regression was used to further analyze the data (Muijs, 2004; Creswell, 2014). The analysis allowed for the identification of a model for determining the probability of persistence of a learner in the first online course and enrollment in the next two terms.

In Chapter 1, the researcher introduced the issue of learner persistence in online courses. The conceptual framework for the study was presented, and a brief overview of relevant literature pertaining to the study was given. The researcher examined which combination of variables could be used to predict the persistence of college learners in

the first online course and enrollment in the next two terms. Chapter 2 consists of a

review of the literature pertaining to the variables presented. Chapter 3 consists of a

description of the research design and methodology. In Chapter 4, the findings are

presented. In Chapter 5, the researcher includes a summary, conclusion, implications for

college administrators, and recommendations for further research.

Chapter 2

Literature Review

The purpose of this literature review is to provide the reader with background information related to online courses and the ways learner characteristics can be used to predict whether or not a college learner will persist in an online course. It reviews the literature related to the persistence of learners in higher education. Traditional persistence theories and models are examined, and the literature pertaining to the retention of learners in the distance higher education environment is reviewed. The chapter concludes with an examination of the literature exploring persistence of learners in online courses, specifically by highlighting the variables investigated in this study.

Garrison (2011) discussed the pedagogical and technological innovations that are redefining higher education. He noted that quality and cost reduction pressures are creating conditions for this transformation. Many colleges and universities have adapted to this new reality and are offering courses and even complete academic programs online. The 2014 report from the Babson Survey Research Group (Allen & Seaman, 2014) shared results showing that the number of higher education institutions reporting that online education is critical to their long-term strategy had reached an all-time high that year of close to 70%. Allen and Seaman stated that learner retention in this online environment is an emerging issue as the number of learners taking online classes increases. They reported a growing concern among academic leaders on the issue of learner persistence: 41% of chief academic officers said that they agree that retaining learners is more difficult with online courses than with face-to-face courses, almost a

50% increase in concern since 2009.

On the one hand, research suggests that learners who complete online courses learn as much as those in face-to-face instruction, earn equivalent grades, and are equally satisfied (Jahng, Krug, & Zhang, 2007; Phipps & Merisotis, 1999; Sitzmann, Kraiger, Stewart, & Wisher, 2006; Zhao, Lei, Yan, Lai, & Tan, 2005). On the other hand, some studies have shown that the persistence rates in many online courses were significantly lower than in similar traditional, face-to-face courses (Holder, 2007; Lee & Choi, 2011; Moore & Hart, 2004; McCracken, 2009; Patterson & McFadden, 2009; Rovai, 2003; Schreck, 2004). McCracken reported that dropout rates of online courses were 20% to 80% higher than for similar traditional face-to-face courses. Schreck found that online persistence rates were 16% lower than face-to-face persistence rates. Because of inconclusive data on persistence for online courses, the issue continues to be of importance as a research topic. As more and more higher education institutions are adopting online education, and several research studies have shown low persistence rates in online courses and programs, concerns have emerged about academic accountability in terms of learner outcomes measured by persistence and a passing grade (Boston & Ice, 2011). It is critical to understand the factors that contribute to learner ability to persist in online courses and programs.

Learner Persistence and Attrition Models

Over the past four decades, several theoretical models have been developed in order to explain the psychological, sociological, organizational, and economic influences that affect learner persistence and attrition rates (Astin, 1993; Bean, 1980; Bean &

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Metzner, 1985; Kember, 1995; Paulsen & St. John, 2002; Spady, 1970; Tinto, 1975).

William G. Spady is considered to be the first to study persistence via an analytical-exploratory study (Berger & Lyons, 2005). Spady compared the process of dropping out of school to committing suicide while in college. His model is based on Durkheim's (1951) suicide model. Building on the work of Spady, Tinto (1975, 1993) later developed his Learner Integration Model that suggested that a learner's retention is influenced by the learner's pre-entry attributes, goals, and commitments, and by academic and social integration. Bean, with his learner attrition model, proposed that learner persistence is dependent on a learner's background, academic variables, environmental variables such as employment and finances, and social integration. Building on his work, Bean collaborated with Metzner and developed a model to address persistence of nontraditional learners (Bean & Metzner, 1985). Kember presented a model that deals with persistence of nontraditional adult learners in a distance learning setting. Each of these models is described in more detail below.

     Spady's model. One of the first widely referenced learner persistence studies is by Spady (1970), entitled "Dropouts from Higher Education: An Interdisciplinary Review and Synthesis." Berger and Lyons (2005) noted that although the issue of persistence had been examined earlier, Spady was the first to analyze persistence using an analytical-exploratory study. These authors discussed Spady's initial model, which identified five independent variables (academic potential, normative congruence, grade performance, intellectual development, and friendship support) that are directly related to social integration. The model then indirectly linked these five independent variables to

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the dependent variable, dropout decision, through two intervening variables (satisfaction and institutional commitment).

Berger and Lyons discussed Spady's comparison of the attrition process of college learners to committing suicide. They also referred to his longitudinal study in support of his proposed model for college learner attrition that involved 683 first-year undergraduates who attended the University of Chicago from 1965–1970. The study group was 62% male, with 35% in the upper 2% of their high school graduating class and 66% with scores above the 90th percentile on the SAT. Spady's multiple regression analysis led him to conclude that his model could be used to describe learner dropout behavior, but he qualified his results by saying that men's dropout decisions were more based on extrinsic factors, while women were more influenced by intrinsic factors such as social integration.

Tinto's Learner Integration Model. Vincent Tinto is considered an academic pioneer who began researching potential reasons for traditional learners' dropout rate. Tinto (1975; 1987) identified academic and social integration as the two most important factors in predicting persistence. He based his model on the work of the early 20th-century Dutch anthropologist Van Gene as well as Durkheim's model of suicide. Tinto (1993) referenced Van Gene's work to identify stages of learner withdrawal and dropout and characterized the process as involving three stages: separation, transition, and incorporation. Tinto focused on the differences between learners as they enter college in terms of their background attributes and experiences, their personal expectations for educational achievement, and level of affinity with their chosen college. The Learner

Integration Model considers formal and informal social and academic experiences in determining a learner's level of integration at a particular institution.
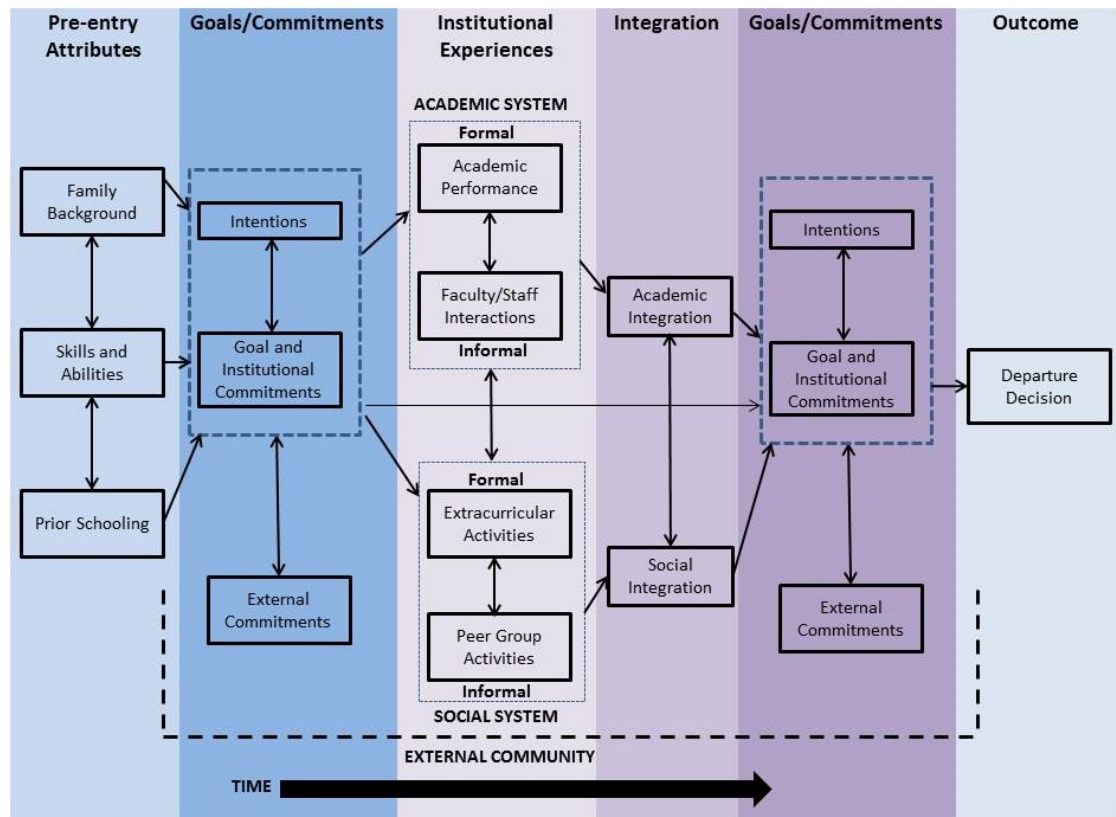
Figure 2.1. Tinto's model of learner departure (1975, 1993).

Tinto (1975) noted that the learner's level of integration shapes his or her commitment level, which in turn is reflected in persistence or retention until graduation, and he identified six specific factors shown to influence learner persistence: (a) pre-entry attributes and characteristics; (b) goals; (c) academic and social integration; (d) institutional experiences; (e) commitments; and (f) academic preparedness. The main idea of this Learner Integration Model was the concept of integration and the patterns of interaction between the learners and the institution, especially during the critical first year

of college and the phases of transition during that year.

Tinto (2006) later critiqued his model and noted that his original model had limitations, as it did not analyze impact of learner finances on persistence or of dropping the course to transfer to another institution or completely withdraw from college. Tinto's model was originally focused on traditional learners at traditional institutions. Instead of examining learner attributes and their correlation with learner failure, Tinto suggested that universities may be the cause of learner attrition.

Bean's model of learner departure. Bean (1980) proposed a model that posits that intention to stay in school, and resultant persistence, is affected by learners' beliefs about their experiences in school. He based his model of learner persistence and attrition on the models proposed by Spady and Tinto in the early 1970s, and also applied organizational behavior theories concerning job turnover to postsecondary education. He suggested that learner departures from higher education could be explained by reasons similar to those behind employee departures. Bean expanded the models of Spady and Tinto by proposing five specific factors in learner attrition: (a) learner background variables, (b) interaction by learners within the institution, (c) environmental variables (finances, family support), (d) attitudinal variables (self-perception of quality and satisfaction within the institution), and (e) learner intention, such as transfer and degree attainment. Bean's revised model of learner persistence thus integrated academic variables, learner intent, goals, expectations, and external and internal environmental factors.

Bean and Metzner's model. Noticing that nontraditional learners (older, part-

time, and commuter) had begun enrolling in larger numbers, Bean collaborated with

Metzner and developed a learner persistence model for nontraditional learners that took

into account the influence of environmental factors on learner departure and attrition.

The Bean and Metzner model (1985) employed academic variables such as grade point

average and previous academic performance, as well as psychological variables like

learner satisfaction and stress, in relation to learner outcomes. The authors concluded

that nontraditional learners' goals are more often focused on their education as a means to

advance their career.

Braxton, Hirschy, and McClendon (2004) suggested that because nontraditional

learners are less affected by their social integration, their persistence relates more to their

external pressures, such as family commitments, financial constraints, travel, and job

pressures. These other commitments force the nontraditional learner to make decisions

on time allocations. If the external pressures become too great, and goal commitment

wanes, then the nontraditional learner may not persist.

Kember's model. Kember (1995) suggested that, although Bean and Metzner's

model does provide some insight about adult learners, it is limited by its lack of attention

to the geographic separation of teacher-learner in distance learning. Kember's model

deals with persistence of nontraditional adult learners in an online environment and is

based largely on Tinto's (1975; 1987) model. However, it also takes into account the

differences between traditional full-time residential learners and nontraditional distance

learning learners, and focuses less on the internal environment of integration into the

university community and more on the external environment and how learners are able to

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balance all of their family and work commitments with school. It should be noted that Kember's model was originally developed and tested for distance learning conducted via correspondence education.
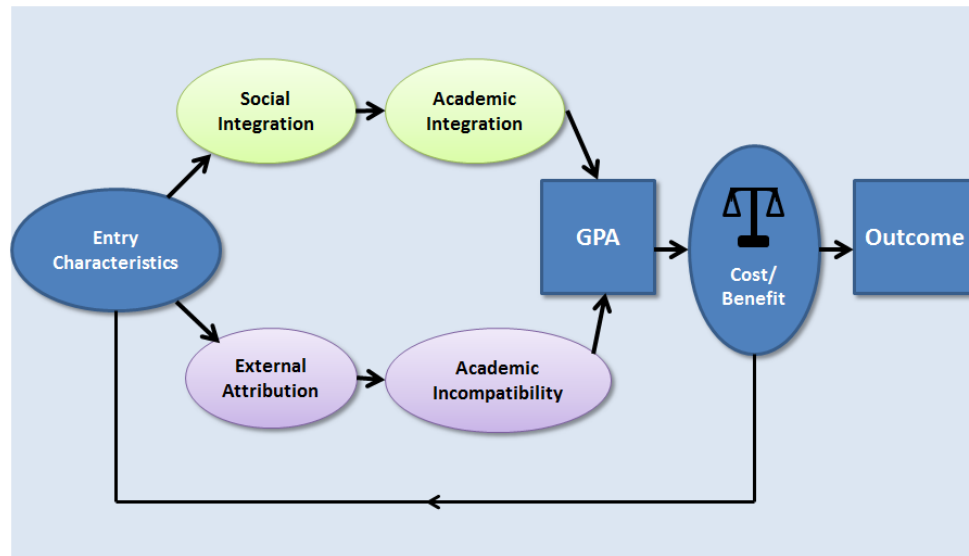
Figure 2.2. Kember's model of learner progress in distance education (1995).

Summary

Common elements exist among the models of learner persistence. All the models include background variables such as individual abilities and goals as important factors in persistence in higher education. In addition, to some extent they all consider learners' interactions or involvement with the academic and social aspects of the college to be important.

Learner Persistence

Tinto (1993) defined persistence as the voluntary choice to continue a course of action so that the benefits of going on are perceived to outweigh the costs. Tinto also stated that persistence in an online learning environment involves the willingness and the

choice to continue in a program until graduation. Based largely on the theories of learner

retention, a body of research (Aragon & Johnson, 2008; Astin, 1993; Bean, 1980; Bean &

Metzner, 1985; Harrell & Bower, 2011; Kember, 1995; Menager-Beeley, 2001; Moore,

2001; Park & Choi, 2009; Paulsen & St. John, 2002; Spady, 1970; Sullivan, 2001; Tinto,

1975; Tyler, 1993; Valasek, 2001) has developed that examined learner persistence. The

traditional learner, nontraditional learner, distance education, and online course

persistence theories are examined in the following literature review.

Traditional learner characteristics. According to Tyler (1993), there are four

agreed-upon characteristics of the traditional undergraduate college learner: (a) full-time

learner status, (b) age 18 to 24, (c) financially dependent, and (d) enrolled immediately

after high school with a traditional high school diploma. According to this author, these

learners were unmarried and had little socialization outside of their school experience.

He found that most of them moved to campus directly from the home of their parents,

and when they arrived at campus, tended not to work outside of college or were

employed only part time. He noted they also remained financially dependent on their

parents and had no dependents of their own to support. Research conducted by Horn

(1996) has identified the trend that learners who do not fit the definition of the traditional

learner make up an increasingly large segment of the college population.

Nontraditional learner characteristics. In recent years, socioeconomic

changes, changes in college-age populations, disposable income, unemployment rates,

and flexibility through online courses have increased the number of nontraditional

learners (Hostetler, Sweet, & Moen, 2007; NCES, 2014). According to the National

Center for Education Statistics (NCES, 2014), the number of learners age 25 and older at U.S. colleges and universities grew by 41% between 2000 and 2011. The report projected that total enrollment in postsecondary degree-granting institutions will grow 14% from 2011 to 2022, an increase that will still surpass the growth in traditional undergraduate enrollment by 1% for the same period. This information suggests that the number of nontraditional learners will very likely continue to grow.

Demographics of nontraditional learners. The National Center for Educational Statistics (NCES, 1996) defined nontraditional learners as those who are included in any of the following seven categories: (a) those who delayed enrollment into college, that is, those who did not enroll in college immediately after high school; (b) part-time learners, defined as learners attending school for fewer than 12 credits a semester or 10 credits a quarter; (c) financially independent learners; (d) those who work full-time, defined as working 35 or more hours per week outside of the home; (e) those with dependents other than a spouse, including children or other relatives such as a parent or grandparent; (f) single parents, or those who are responsible for more than 50% of their child's upbringing; and (g) those who did not receive a standard high school diploma, including those with a high school equivalency degree or who have taken the General Educational Development test (GED). A learner who meets one of the seven characteristics of a nontraditional learner is considered minimally nontraditional, a learner who meets two or three of the seven nontraditional characteristics is considered moderately nontraditional, and a learner who meets four or more of the nontraditional characteristics is considered highly nontraditional (Horn, 1996).

In 1970, learners age 24 and older accounted for 28% of the college population. In 2001, the representation of that demographic was larger, accounting for 44% of the total college population (NCES, 2002). In addition to the number of older learners on campus, other changes in the characteristics of today's college learners have taken place. Horn (1996) reported that 21% of undergraduate learners had dependents other than a spouse, and 27% worked full time. According to NCES (2003), 40% of all college learners attend part time.

Nontraditional graduate learners. Redd (2007), in a study of older nontraditional learners, reported that these learners attended graduate school programs for two key reasons: They wanted to enhance their careers or start new ones; and they were living longer, healthier lives and believed further education would help them remain physically and mentally active for a longer period. Some individuals were first-time graduate learners, while others were seeking a second master's or a doctoral degree. The author found that many of the older graduate learners had been in the workforce for a number of years. As a result, they tended to have higher incomes than other graduate learners. NCES (2006) reported that in 2004, the median annual adjusted gross income (AGI) of nontraditional learners was $55,000, more than twice as large as that of learners under 30.

Distance education persistence. Rovai (2003) found that although many of the variables shown to influence persistence in the traditional college setting are the same as those that affect persistence in distance education, the nature of the distance education environment, specifically the separation between the learners and faculty, suggests that

additional variables must be identified that are specific to this environment. Rovai developed theoretical retention models specific to the distance education environment. Fjortoft (1995), Parker (1999), and Pugliese (1994) identified variables that impact college learner retention, variables that influence persistence, and barriers that result in attrition. These authors examined various types of distance education, including correspondence, satellite, radio, and online courses.

Fjortoft (1995) developed a theoretical model of persistence in distance learning programs, grounded in Tinto's previous work, that used individual learner characteristics. Fjortoft's theoretical model consisted of five sets of variables: (a) individual characteristics, (b) previous college experience, (c) intrinsic job satisfaction, (d) attitude toward learning, and (e) intrinsic and extrinsic perceived benefits of persisting toward degree completion. Fjortoft developed a survey to test the model. The study sample consisted of 395 post-baccalaureate learners, of whom 179 were enrolled at the time of the study and 216 had withdrawn from the distance education program. A total of 198 learners returned the survey, yielding a response rate of 50%. The sample was equally distributed between genders. The majority of learners were Caucasian, married, with children, and between the ages of 30 and 40. A regression analysis was completed to test the predictive validity of the model. The most influential independent variable was higher perceived intrinsic benefits, which increase the likelihood of a learner's ability to persist. Fjortoft noted that the level of ease with independent learning has a negative influence on persistence and concluded that learners who are motivated by better job performance rather than extraneous gain are more likely to persist. The researcher

concluded that older learners are not as likely to persist and, furthermore, suggested that additional research should be expanded beyond the use of existing persistence models, similar to Tinto's 1975 model, to include unique characteristics of adult learners and the unique characteristics of the distance learning environment.

Online course persistence. While researching distance education, Fjortoft (1995) wrote that it is important to continue to examine how the unique characteristics of the distance education learning environment have an integral role in the persistence of learners in that environment. Rovai (2003) wrote that this is especially important when examining online environments, because a learner's decision to drop out would be influenced not only by social integration, academic integration, external pressures, and separation from classmates and instructor, but also by the pressures that are presented by the online technologies. Rovai developed a composite model for persistence in online courses by combining relevant elements from the persistence theories of Tinto (1987) and Bean and Metzner (1985) with other variables that are directly relevant to the online environment.

Rovai's (2003) model was classified into two major sections, "prior to admission" and "after admission." The "prior to admission" section was composed of the learner characteristics that Tinto (1975) and Bean and Metzner (1985) identified in their persistence models. According to Rovai, these characteristics included age, ethnicity, gender, academic preparation, intellectual development, and academic performance. Rovai noted that learner skills that were determined to be relevant to learner success in the online environment were also included in the "prior to admission" section; these skills

included computer literacy, information literacy, time management, reading and writing, and computer-based interaction (McGlynn, 2012).

The "after admission" section included external factors, as determined by Bean and Metzner (1985). These external factors included finances, hours of employment, and family responsibilities. Internal factors were also included in the "after admission" section (Bean & Metzner, 1985; Tinto, 1975). The internal factors Rovai included were Tinto's social and academic integration, as well as Bean and Metzner's study habits, advising, stress, and current GPA. Learner needs were also included in this section: self-esteem, clarity of programs, and accessibility of services.

Rovai's comprehensive and theoretical model of 2003 was developed primarily through a review of literature. Although Rovai did not test reliability and validity of the model, it does identify many variables that could have a significant impact on the retention of online learners, and many of these variables have been studied in the subsequent scholarship of online learning.

Willging and Johnson (2004) used several of Rovai's variables in their research on online learner persistence at the University of Illinois at Urbana-Champaign. They developed a survey instrument composed of open-ended and closed-ended questions and administered it to 28 learners who had dropped out of the online master's program. Seven independent variables (age, gender, cohort, ethnicity, occupation, location, and GPA) were examined in the survey. Logistic regression and Pearson correlations were conducted on the data.

The Willging and Johnson model correctly predicted only 39% of the observed

cases. Although the model was weak, the researchers did identify a number of variables that have an influence on persistence. They grouped the reasons that the learners failed to persist into four areas: (a) personal, (b) job related, (c) program related, and (d) technology related. These findings helped to validate the inclusion of learner characteristics, learner skills, external factors, and internal factors in Rovai's 2003 model.

One of the more significant findings of Willging and Johnson's 2004 study was that 90% of the learners who dropped the course indicated that they completed their course assignments at home. The respondents stated that their home environment gave them the convenience and privacy they needed to be successful, even though most eventually dropped the online course. Willging and Johnson found a number of learner characteristics that have an influence on the persistence of online learners. They found that learners who had already successfully completed online courses are more likely to persist in subsequent online courses, and they also noted that learners enrolled in their first online course are more likely to be troubled with the online format and technology and therefore are less likely to persist. Finally, they said that their results indicated that males are more likely to persist than females, minorities (other than blacks) are more likely to drop out, and learners with higher GPAs are more likely to persist.

Computer access and experience. Schilke (2001), in a report on online learning, stated that the use of the Internet in the delivery of online courses requires a certain level of experience in using the technologies, as well as a certain level of open access to computers equipped with the technologies needed to complete assignments. In a qualitative study of college learners who had previously withdrawn from online courses,

Schilke found that a large portion of the learners gave technological barriers as a reason for their withdrawal. Some of these learners noted that they enrolled in their online courses having little to no experience in computer use. Others said that they lacked basic computer skills, including the skills necessary to navigate the Internet (Ojokheta, 2011). Many of the learners who did not have a computer at home found it very difficult to be successful in the online environment. Hughes (2002) also stated that online learners' computer experience and access to computers has an impact on course retention.

Moore (2001) gathered data from the college learner database at Phoenix College to develop a better understanding of the factors related to the success of learners in a web course. The researcher developed an electronic survey and sent it to a total of 252 learners registered in three different web courses. Of these, 144 completed and returned the survey, for a response rate of 55.55%. Descriptive statistics, chi-square correlations, and logistic regression were used to analyze the data. The most significant finding was that lack of computer experience presents a major barrier to success. This reinforces Schilke's (2001) findings on the impact of computer experience and access on online college persistence.

Previous online experience. Schilke (2001) wrote that the skills needed to succeed in the online environment are unique. According to Schilke, a learner who had been previously successful in an online course may have developed the necessary skills needed to be successful in the online environment, which could lead to increased persistence and success in future online courses. Schilke noted learners may be less likely to persist and succeed if they are enrolling in an online course for the first time

because they may not have acquired the necessary skills required to be successful in the online environment.

Background Characteristics

Background characteristics is a term that tends to represent commonly collected information describing the personal attributes and characteristics of learners (Airasian & Gay, 2003). The personal attributes of age, gender, and ethnicity were examined along with the learner characteristics of GPA and credit hours earned.

Age. Age was a variable of interest in many studies of learner persistence and retention (Bean, 1980; Bean & Metzner, 1985; Muse, 2003; Tinto, 1975; Valasek, 2001). Bean and Metzner, in a review and synthesis of over 40 postsecondary dropout studies, concluded that age by itself does not represent a major factor, although the learner's age and family responsibility or hours of employment may be significantly associated with persistence.

Gender. Gender was an independent variable in many studies of learner persistence and retention (Ackerman, Kanfer, & Beier, 2013; Bean, 1980; Bean & Metzner, 1985; Harrell & Bower, 2011; Menager-Beeley, 2001; Moore, 2001; Sullivan, 2001; Tinto, 1975; Valasek, 2001). The studies by both Bean and Tinto showed that women, as a group, are more likely to depart voluntarily than are men; males are more likely to stay in college until forced to leave for academic reasons. In a review and synthesis of over 40 postsecondary dropout studies, Bean and Metzner noted that because men and women still have distinctive (i.e., stereotypical) roles outside of college, it is important to include gender in models of learner persistence.

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Menager-Beeley (2001) found that gender has no influence on course retention when examining learner success in the web-based environment. In contrast, two studies concluded that gender does influence success (Moore, 2001; Valasek, 2001). Specifically, women were found to be more successful in the online environment than men.

Sullivan (2001) examined the influences gender has on the persistence of online learners. Sullivan presented two open-ended questions to all learners enrolled in 72 online courses at 15 different Connecticut institutions. The questions were:

1. Is there anything about the online classroom that has made it easier for you to learn, achieve your academic goals, or participate in class discussions (as compared to the traditional classroom)?

2. Is there anything that has made it harder? (Sullivan, 2001, p. 805)

Of the 25,000 learners enrolled in the 72 online courses, 240 females and 85 males completed the survey, a response rate of 8%. The author's data analysis suggested various areas previously identified as having an effect on persistence in the online environment. Sullivan found that a smaller percentage of male learners indicated that they missed the interactions that occurred in the traditional classroom. This study showed that a larger percentage of the female learners made negative remarks about the large amount of self-discipline and self-pacing needed to be successful in the online environment. Sullivan noted that more women indicated that they enjoyed the flexibility of the online environment, because it allowed them more freedom in dealing with their family responsibilities. This finding was confirmed by Moore, Bartkovich, Fetzner, &

Ison(2003), who found that more women than men cited work and family obligations as reasons for withdrawing.

      Ethnicity. Multiple studies have found that minority learners, especially African-American learners, are not as successful in their online courses as white learners (Fetzner, 2013; Moore, 2001; Moore et al., 2003). A major reason noted in the studies for the lack of ethnic minority learner success experienced in online courses was lack of access to computers needed to complete the course assignments. Although these two studies found ethnicity to be a predictor of online persistence and success, Menager-Beeley (2001) concluded that ethnicity has no impact on the success of an online learner.

      GPA and credit hours. College GPA was found to be a significant predictor of success in online courses (Hachey, Wladis, & Conway, 2014; Harrell & Bower, 2011; Menager-Beeley, 2001; Morris, Finnegan, & Wu, 2005; Valasek, 2001). Learners with higher GPAs are more likely to persist than learners with lower GPAs (Osborn, 2001). Osborn found that GPA is not a significant predictor of success when studied in isolation. Harrell and Bower reported that GPA is significantly predictive of learner persistence. The number of college credit hours previously earned was found to be a significant predictor of success in online courses (Moore et al., 2003). Moore et al. found that learners having 30 or fewer credit hours are less likely to persist in online courses than learners who had earned greater than 30 credit hours.

Summary

      In order to understand the possibilities for ways learner characteristics can be used to predict whether or not a college learner will persist in an online course, it was

necessary to examine areas of current educational research on this topic. This chapter reviewed the literature related to persistence of learners in higher education institutions. Traditional persistence theories were examined, followed by an examination of the literature pertaining to persistence in the distance education environment.

This chapter concluded with an examination of literature exploring the persistence of learners in online courses, specifically by highlighting the variables that were investigated in this study. In Chapter 3, the methodology of this study will be discussed in detail. In Chapter 4, the findings will be presented. In Chapter 5, a summary, conclusions, implications for practitioners, and recommendations for further research will be provided.

Chapter 3

Methodology

The purpose of this research was to examine how learner characteristics can be used to predict whether or not a college learner will persist in the first online course and enroll in the next two terms. The major research question guiding the study was as follows: Which learner characteristics can be used to best predict the persistence of college learners in online courses? In order to investigate this question, examinations of the learners' preadmission data were used to predict persistence in an online environment. This chapter provides descriptions of the research methods, organized into several different sections. They include descriptions of the research setting, participants, instrumentation, data collection procedures, and data analyses.

Research Questions

The research questions for this study were:

1. What is the significant difference between characteristics of learners who persist in their first course and those of learners who drop out of their first course with respect to:

    a. the learner's pre-course basic verbal score

    b. the learner's college application score

    c. the learner's degree level

    d. the learner's start date.

2. What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first

course, and enrollment in the next two terms?

Research Design

Creswell (2014) noted that specific research approaches are needed to answer different types of research questions. He states that "if the problem calls for (a) the identification of factors that influence an outcome; (b) the utility of an intervention; or (c) understanding the best predictors of outcomes, then a quantitative approach is best" (p. 20). Since the current research questions called for identification of learner characteristics that influence outcomes, that is, learner persistence, a quantitative research approach was designed to answer the research questions. To address the first research question, the chi-square test of association, a nonparametric test, was used to discover if there is a relationship between two categorical variables. To address the second research question, a correlational research design was chosen because the purpose of the study was to determine the combination of variables that could be used to predict the persistence of college learners in online courses (Airasian & Gay, 2003; Creswell, 2014).

Setting. All participants in this study were enrolled in online public service and health graduate programs at a large Midwestern university. These programs were completely online and used Blackboard Learn 9.x as the learning management system. All learners were required to take the first course in the first term of the program to provide orientation to the online learning environment and introduction to the field of study. Typical class size was 25 learners, and the class was offered monthly. Learners were required to complete their first course before registering for the next course(s), which were offered quarterly.

Participants. All participants in this study were enrolled in one of the online

graduate programs at this large Midwestern university. The total number of participants

was 2,674 graduate online learners. There were some data missing, as reported in the

statistics summary table. All learners who successfully completed the program admission

application process were included in the study.

Instrumentation. Several types of data were examined in this study. The

dependent variable was the learner's persistence in the first course and enrollment in the

next two terms. For the purpose of this study, a learner was deemed to be persistent if

they enrolled in the first course from April 2013 through March 2014, successfully

completed the course, and enrolled in the next two terms. Independent variables as

identified in the literature were learner goals and aspirations (application score) and

academic readiness (pre-course basic verbal score). Other independent variables that

interest the researcher but were not suggested in the literature review were the

participant's degree level and start date.

Data collection procedures. As a part of the admission process, all learners were

required to complete an application form and take a basic verbal test. Application score

was calculated internally by the university for each learner using the information

provided by learner at the time of application. Application scores were recorded from 0

to 1, with 0 being the minimum score and 1 being maximum. Application scores

represented learner skills and attributes, such as goals, aspirations, computer literacy,

information literacy, and time management. Learner basic verbal scores ranged from 0 to

3 and were directly obtained from a basic verbal assessment, a 20-minute timed test with

50 questions. Learner basic verbal scores were categorized into four groups: high, moderate, low, or very low. High comprised learners with a score of 3; moderate, a score of 2; low, a score of 1; and very low, a score of 0. Degree levels were divided into master's (including MS and professional master's) and doctoral (including PhD and professional doctorate). Learners could enroll in the first course on a monthly basis. The data collected were for each month between April 2013 and March 2014. The start date was grouped into first, second, and third month of each quarter, resulting in three groups with 4 months in each group. Learners were considered to have completed their first course when they received any grade except *W* (Withdrawal) or *F* (Fail). Learners could enroll in a term after they had enrolled in the first course; however, they could not continue if they got a *W* or an *F* grade in their first course. All data related to a participant's pre-course basic verbal score, application score, degree level, start date, first course completion, and enrollment in the next two terms were obtained from existing graduate program records. The data were collected from April 2013 through October 2014 terms. The learners who had started their first course in March 2013 could enroll in the next two terms, that is, July and October 2014.

Data Analysis

This study was designed to determine which combination of variables can best be used to predict the persistence of college learners in online courses. The retrieved data were in Microsoft Excel spreadsheets. The erroneous data were cleaned up in Microsoft Excel. The researcher exported the dataset into the SPSS for data analysis.

The chi-square test, a nonparametric statistical test, was used to determine if there

were any significant differences between variables of the data. The two assumptions were tested and passed for the data before using the chi-square test of association. The first assumption was that the variables should be measured at an ordinal or nominal level (i.e., categorical data). The second assumption was that the variables should consist of two or more categorical, independent groups.

Using SPSS, the following descriptive statistics were used to describe the data: frequency distributions, means, standard deviations, and percentages. Stepwise logistic regression was used to further analyze the data (Muijs, 2004; Creswell, 2014). The analysis allowed for the identification of a model for determining the probability of persistence of a learner in the first online course and enrollment in the next two terms. The following three assumptions were tested and passed before running a stepwise logistic regression:

1. The first assumption was that the dependent variable should be measured on a dichotomous (binary) scale.

2. The second assumption was that one or more independent variables could be continuous or categorical.

3. The third assumption requires independence of observations, and the dependent variable should have mutually exclusive and exhaustive categories.

The following table (Table 3.1) lists the data collected for this study along with possible values and scale of measurement. Figures 3.1 and 3.2 illustrate variables (independent and dependent) and data analysis for research questions 1 and 2.

Table 3.1

Data Collected, Possible Values, and Scale of Measurement

Data Collected	Possible Values / Codes	Scale of Measurement
Pre-course basic verbal score	Very low = 0 Low = 1 Moderate = 2 High = 3	Ordinal
Application score	0.2-0.299 = 1 0.3-0.399 = 2 0.4-0.499 = 3 0.5-0.599 = 4 0.6-0.699 = 5 0.7-0.799 = 6	Ordinal
Degree level	Master's (MS, professional master's) = 1 Doctoral (PhD, professional doctorate) = 2	Nominal
Start date	First month of each quarter (January 2014, April 2013, July 2013, October 2013) = 1 Second month of each quarter (February 2014, May 2013, August 2013, November 2013) = 2 Third month of each quarter (March 2014, June 2013, September 2013, December 2013) = 3	Nominal
First course completion	0 (*W* or *F)* or 1 (complete)	Binary
Enrollment in the next two terms	0 (did not enroll in at least one term after the first course) or 1 (enrolled in the next two terms after the first course)	Binary

Question 1

Independent Variables   Dependent Variable

Pre-course basic verbal score

Mean application score

chi-square

Degree Level

First course completion

Start date
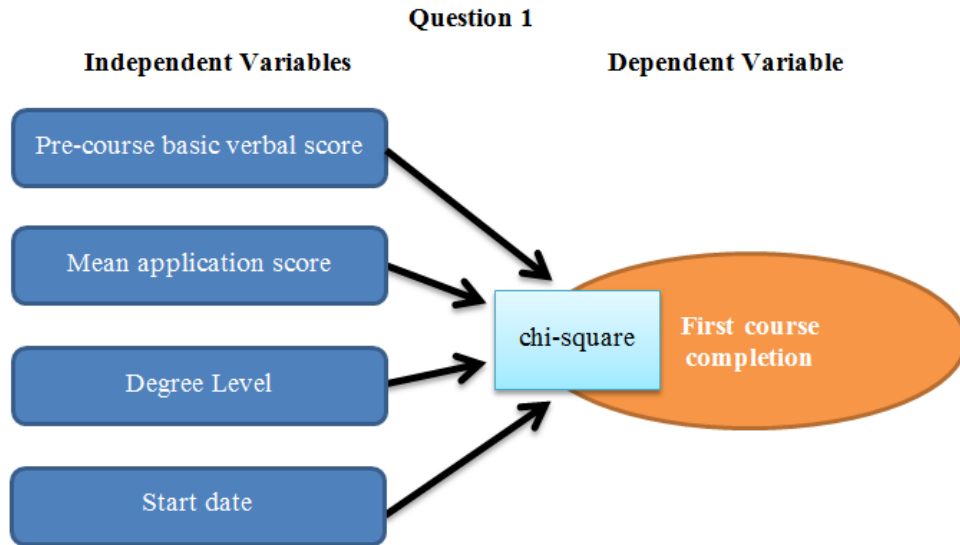
Figure 3.1. Research variables and data analysis to address research question 1.

Question 2

Independent Variables   Dependent Variable

Pre-course basic verbal score

Mean application score

Logistic Regression

Degree Level

First course completion + enrollment in the next two terms
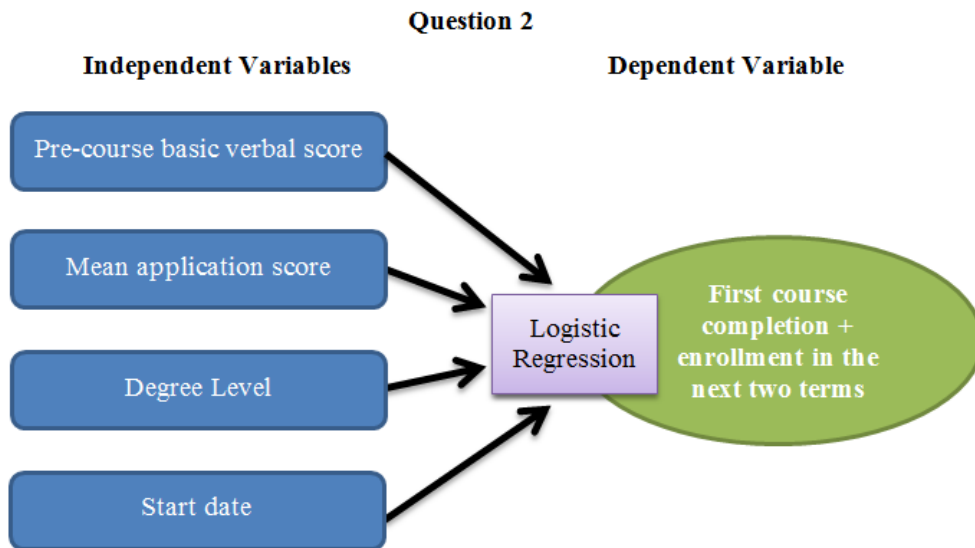
Start date

Figure 3.2. Research variables and data analysis to address research question 2.

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Chapter 4

Analysis of Data

The purpose of this research was to analyze which learner characteristics could be used to best predict the persistence of college learners in online courses. A quantitative study was conducted to investigate the research questions. The research questions for this study were

1. What is the significant difference between characteristics of learners who persist in their first course and those of learners who drop out of their first course with respect to:

    a. the learner's pre-course basic verbal score

    b. the learner's college application score

    c. the learner's degree level

    d. the learner's start date.

2. What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first course, and enrollment in the next two terms?

This chapter provides details of the data preparation, statistical tests, logistic regression analysis, and results.

Data Preparation

The data were obtained from existing graduate program records in a Microsoft Excel file with learner information de-identified by the institution. The data were sorted in Microsoft Excel for easier removal of extraneous data and the recoding process. Once

the formatting process was completed in Microsoft Excel, the data were uploaded into

SPSS for further data preparation and statistical analyses. The sample included 2,674

online learners ($n = 2,674$) from one of the public service and health graduate programs at

a large Midwestern university. Some learners were exempt from taking the pre-course

basic verbal assessment, so there were some data missing. The learners were removed

from the final analysis if data were missing for any independent variable.

Application scores were recorded from 0 to 1, 0 being minimum score and 1

being maximum. Application scores ranged from 0.258 to 0.760. The continuous

variable was converted to an ordinal variable to create the six groups shown in Table 3.1

in Chapter 3. The learners were placed into a specific group based on their application

score.

Another independent variable that was grouped for more meaningful analysis was

the start date. Learners could enroll in the first course on a monthly basis. The data

collected were for each month between April 2013 and March 2014. The start date was

grouped into first, second, and third month of each quarter, resulting in three groups with

four months in each group.

Descriptive Statistics

The sample in this study was 2,674 online learners ($n = 2,674$) from one of the

public service and health graduate programs at a large Midwestern university. The

descriptive statistics computed for all participants are presented in Table 4.1. The pre-

course basic verbal score ranged from 0 to 3. The mean for pre-course basic verbal score

was 2.23 (SD = .796). The result of the analysis shows that most of the participants

(1795; 85.8%) received Moderate (2) or High (3) scores, and only 96 (14.2%) received

Low (1) or Very Low (0) scores in the pre-course basic verbal assessment.

Table 4.1

Descriptive Data Summary of Independent Variables

Variable	*n*	*Valid %*	*M*	*SD*
Pre-course basic verbal score	2091	100	2.23	.796
Very low = 0	90	4.3		
Low = 1	206	9.9		
Moderate = 2	927	44.3		
High = 3	868	41.5		
Application score	2635	100		
0.2-0.299 = 1	6	0.2		
0.3-0.399 = 2	83	3.1		
0.4-0.499 = 3	505	19.2		
0.5-0.599 = 4	1347	51.1		
0.6-0.699 = 5	661	25.1		
0.7-0.760 = 6	33	1.3		
Degree level	2674	100		
Master's (MS, professional master's) = 1	2004	74.9		
Doctoral (PhD, professional doctorate) = 2	670	25.1		
Start date	2674	100		
First month of each quarter (January 2014, April 2013, July 2013, October 2013) = 1	1412	52.8		
Second month of each quarter (February 2014, May 2013, August 2013, November 2013) = 2	625	23.4		
Third month of each quarter (March 2014, June 2013, September 2013, December 2013) = 3	637	23.8		

The learners were assigned to one of the application score groups (1–6) based on

their application score. The majority of the participants (1,347; 51.1%) were in the

application score group with a score in the range of 0.5 to 0.599.

Degree levels were divided into master's (including MS and professional

master's) and doctoral (including PhD and professional doctorate) programs.

Approximately three fourths (74.9%) of the learners were in master's degree programs,

and one fourth (25.1%) were in doctoral degree-level programs.

Learners could enroll in the first course on a monthly basis. The data collected

were for each month between April 2013 and March 2014. The start date was grouped

into first, second, and third month of each quarter, resulting in three groups with 4

months in each group. The majority of the learners (52.8%) started their first course in

the first month of the quarter (January, April, July, or October). Second and third months

of the quarter had an almost even percentage of the learners (23.4% and 23.8%,

respectively).

Statistical Tests and Results

In this section, results of the statistical tests are presented in order to address the

two research questions. First, chi-square tests were used to determine if there were any

significant differences between the variables of the data. Then stepwise logistic

regression was used to understand whether learner persistence can be predicted based on

learner's pre-course basic verbal score, application score, degree level, and start date.

Research question one. The first research question for this study was:

What is the significant difference between characteristics of learners who persist in their

first course and those of learners who drop out of their first course with respect to:

    a. the learner's pre-course basic verbal score

    b. the learner's college application score

    c. the learner's degree level

    d. the learner's start date.

Four independent variables were studied for correlation between them and the first course completion variable. The four independent variables were the learner's pre-course basic verbal score, application score, degree level, and start date.

Pre-course basic verbal score. A chi-square test was performed that compared the pre-course basic verbal score of learners who did not complete their first course to learners who did complete. A significant difference was found between the two groups in regard to pre-course basic verbal score (chi-square = 15.659, $df = 3$, $p = .001$). Table 4.2 is a cross tabulation and a frequency chart of the pre-course verbal score variable compared to the first course completion variable. Table 4.6 provides the relationship between the first course completion variable and the learner's pre-course basic verbal score.

Table 4.2

Pre-course Basic Verbal Score (Frequency)

Variable	Did not complete the first course	Did complete the first course	Total
Very low= 0			
Count	32	58	90
Percent	1.5%	2.8%	4.3%
Low= 1			
Count	41	165	206
Percent	2.0%	7.9%	9.9%
Moderate= 2			
Count	189	738	927
Percent	9.0%	35.3%	44.3%
High= 3			
Count	157	711	868
Percent	7.5%	34.0%	41.5%

Application score. A chi-square test was performed that compared the application score of learners who did not complete their first course to learners who did complete the course. A significant difference was found between the two groups in regard to application score (chi-square = 105.084, $df = 5$, $p = .000$). Table 4.3 is a cross tabulation and a frequency chart of the application score variable compared to the first course completion variable. Table 4.6 provides the relationship between the first course completion variable and the learner's application score.

Table 4.3

Application Score (Frequency)

Variable	Did not complete the first course	Did complete the first course	Total
0.2-0.299 = 1			
Count	3	3	6
Percent	0.1%	0.1%	0.2%
0.3-0.399 = 2			
Count	27	56	83
Percent	1.0%	2.1%	3.1%
0.4-0.499 = 3			
Count	166	339	505
Percent	6.3%	12.9%	19.2%
0.5-0.599 = 4			
Count	264	1083	1347
Percent	10.0%	41.1%	51.1%
0.6-0.699 = 5			
Count	69	592	661
Percent	2.6%	22.5%	25.1%
0.7-0.760 = 6			
Count	2	31	33
Percent	0.1%	1.2%	1.3%

Degree level. A chi-square test was performed that compared the degree level of learners who did not complete their first course to learners who did complete. A significant difference was found between the two groups in regard to degree level (chi-square = 7.058, $df = 1$, $p = .008$). Table 4.4 is a cross tabulation and a frequency chart of the degree level variable compared to the first course completion variable. Table 4.6 provides the relationship between the first course completion variable and the learner's degree level.

Table 4.4

Degree Level (Frequency)

Variable	Did not complete the first course	Did complete the first course	Total
Master's (MS, professional master's) = 1			
Count	424	1580	2004
Percent	15.9%	59.1%	74.9%
Doctoral (PhD, professional doctorate) = 2			
Count	110	560	670
Percent	4.1%	20.9%	25.1%

Start date. A chi-square test was performed that compared the start date of learners who did not complete their first course to learners who did complete. No significant difference was found between the two groups in regard to start date (chi-square = .762, $df = 2$, $p = .683$). Table 4.5 is a cross tabulation and a frequency chart of the start date variable compared to the first course completion variable. Table 4.6 provides the relationship between the first course completion variable and the learner's start date.

Table 4.5

Start Date (Frequency)

Variable	Did not complete the first course	Did complete the first course	Total
First month of each quarter (January, April, July, October) = 1			
Count	282	1130	1412
Percent	10.5%	42.3%	52.8%
Second month of each quarter (February, May, August, November) = 2			
Count	131	494	625
Percent	4.9%	18.5%	23.4%
Third month of each quarter (March, June, September, December) = 3			
Count	121	516	637
Percent	4.5%	19.3%	23.8%

Table 4.6

Chi-Square Tests

Variable	Value	*df*	Sig (*p*)
Pre-course Verbal Score	15.659	3	.001
Application Score	105.084	5	.000
Degree Level	7.058	1	.008
Start Date	.762	2	.683

*$p<.05$

Research question two. The second research question for this study was:

What is the relationship between learner characteristics (pre-course basic verbal score,

application score, degree level, and start date) and persistence in the first course, and

enrollment in the next two terms?

Stepwise logistic regression was used for data analysis to answer the second research question of this study. This procedure allows prediction of the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical (Muijs, 2004; Creswell, 2014). A computer algorithm is used to determine the probability and importance of independent variables. Variables are either included or excluded based on a fixed decision rule and in a certain order (Pallant, 2007). All the independent variables were included in the stepwise procedure to determine how each of the independent variables contributes to the prediction of the dependent variable. In order to run a stepwise logistic regression procedure, it is recommended that the ratio of valid cases to independent variables be no less than 10:1, with a preferred ratio of 50:1 (Schwab, 2004). For this study, there were 2,062 valid cases and four independent variables. The resultant ratio of 516:1 exceeds the minimum preferred ratio, so it meets this criterion.

A logistic regression was performed to ascertain the effects of learner's pre-course verbal score, application score, degree level, and start date on the likelihood that participants have persisted in the first course and enrolled in the next two terms.

Model Fit. Table 4.7 illustrates that the logistic regression model was statistically significant: Chi-square = 26.337, $df = 5$, $p < .0005$. Another way of assessing the adequacy of the model is to analyze how poor the model is at predicting the categorical outcomes. This is tested using the Hosmer and Lemeshow goodness of fit test (Pallant,

2007). Table 4.8 shows that the Hosmer and Lemeshow test is not statistically

significant, $p = .270$, indicating that the model is not a poor fit.

Table 4.7

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
	Step	26.337	5	.000
Step 1	Block	26.337	5	.000
	Model	26.337	5	.000

Table 4.8

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	9.923	8	.270

Variance explained. In order to understand how much variation in the dependent

variable can be explained by the model, the Cox & Snell R^2 and Nagelkerke R^2 values

were interpreted. Table 4.9 shows both the values; since the Cox & Snell R^2 cannot

achieve a value of 1, it is preferable to use Nagelkerke R^2 value (Pallant, 2007). The

model explained 1.7% (Nagelkerke R^2) of the variance in learner persistence.

Table 4.9

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	2818.171a	.013	.017

a. Estimation terminated at iteration number 3 because parameter estimates changed by
less than .001.

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Category Prediction. Logistic regression is commonly used to predict whether cases can be correctly classified (i.e., predicted) from the independent variables (Pallant, 2007). There are many methods to assess the effectiveness of the predicted classification against the actual classification, with their usefulness often depending on the nature of the study conducted. However, all methods use the observed and predicted classifications, which are presented in Table 4.10, below. When independent variables were added, the model correctly classified 56.6% of cases.

Sensitivity. Another measure in the logistic regression model is sensitivity, which is the percentage of cases that had the observed characteristic (e.g., "1" for learner persistence) that were correctly predicted by the model (i.e., true positives) was 82.6%. In this case, 82.6% of learners who completed the first course and enrolled in the next two terms were also correctly predicted by the model to be persistent. Table 4.10 shows this information in the "Percentage Correct" column in the "1" row of the observed column.

Specificity. The percentage of cases that did not have the observed characteristics (e.g., "0" for learner persistence) and were also correctly predicted as not having the observed characteristic (i.e., true negatives) is defined as specificity. In this case, 26% of learners who did not complete the first course and enrolled in the next two terms were also correctly predicted by the model not to be persistent. Table 4.10 shows this information in the "Percentage Correct" column in the "0" row of the observed column.

Positive predictive value. The positive predictive value is the percentage of correctly predicted cases with the observed characteristic compared to the total number of

cases predicted as having the characteristic (Pallant, 2007). In this study, the positive predictive value was 56.8%, using the following calculation: 100 x (922 ÷ [700 + 922]). That is, of all cases predicted as having learner persistence, 56.8% were correctly predicted.

Negative predictive value. The negative predictive value is the percentage of correctly predicted cases without the observed characteristic compared to the total number of cases predicted as not having the characteristic (Pallant, 2007). In this study, the negative predictive value was 55.9%, using the following calculation: 100 x (246 ÷ (246 + 194)). That is, of all cases predicted as not having learner persistence, 55.9% were correctly predicted.

Table 4.10

Classification Table[a]

		Predicted		
		Learner Persistence		Percentage
Observed		0	1	Correct
Step 1 Learner Persistence 0		246	700	26.0
1		194	922	82.6
Overall Percentage				56.6

a. The cut value is .500

Variables in the equation. The contribution of each independent variable to the model and its statistical significance is presented in Table 4.11. The Wald test ("Wald" column) is used to determine statistical significance for each of the independent variables. The statistical significance of the test is found in the "Sig." column. Of the

four predictor (independent) variables, only application score ($p < .0005$) added

significantly to the model/prediction. Pre-course basic verbal score ($p = .279$), degree

level ($p = .324$), and start date ($p = .534$) did not add significantly to the model. The *B*

coefficients ("B" column) were used in the equation to predict the probability of an event

occurring. The coefficients did, in fact, show the change in the log odds that occur for a

one-unit change in an independent variable when all other independent variables were

kept constant. Learners with higher pre-course verbal score had 1.06 times higher odds

to complete the first course and enroll in the next two terms. Similarly, a one-unit

increase in application score had 1.29 times higher odds for learners to complete the first

course and enroll in the next two terms. Doctoral degree-level learners with the Exp (*B*)

value of .90 had lower odds to complete the first course and enroll in the next two terms

than master's degree-level learners. Learners who started a course in the second and third

months of a quarter had lower odds to complete the first course and enroll in the next two

terms than learners who started a course in the first months of a quarter.

Table 4.11

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	BasicVerbalScore	.061	.057	1.174	1	.279	1.063	.952	1.188
	AppScoreGroup	.262	.058	20.491	1	.000	1.299	1.160	1.455
	Degree(1)	-.105	.106	.971	1	.324	.900	.731	1.109
	StartDate			1.254	2	.534			
	StartDate(1)	-.126	.113	1.254	1	.263	.881	.706	1.100
	StartDate(2)	-.094	.134	.491	1	.483	.911	.701	1.183
	Constant	-.839	.268	9.755	1	.002	.432		

a. Variable(s) entered on step 1: BasicVerbalScore, AppScoreGroup, Degree, StartDate.

Summary

In summary, this study examined the differences between characteristics of online learners at a large Midwestern university who persist in their first course and those of learners who drop out of their first course with respect to learner's pre-course basic verbal score, application score, degree level, and start date. Chi-square tests were used to determine if there were any significant differences between the variables of the data. Pre-course basic verbal, application score, and degree level had a statistically significant association with learners who completed the first course. A significant difference was found between the two groups in regard to pre-course basic verbal score (chi-square = 15.659, $df = 3$, $p = .001$). A statistically significant difference was also found between the two groups in regard to application score (chi-square = 105.084, $df = 5$, $p = .000$). Also, a significant difference was found between the two groups in regard to degree level (chi-square = 7.058, $df = 1$, $p = .008$). No significant difference was found between the two groups in regard to start date (chi-square = .762, $df = 2$, $p = .683$).

The second question asked: What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first course, and enrollment in the next two terms. A logistic regression was performed to ascertain the effects of pre-course verbal score, application score, degree level, and start date on the likelihood that learners will complete the first course and enroll in the next two terms. The logistic regression model was statistically significant: Chi-square = 26.337, $df = 5$, $p < .0005$. The model explained 1.7% (Nagelkerke R^2) of the variance in learner persistence and correctly classified 56.6% of

cases. The model showed that 82.6% of learners who completed the first course and enrolled in the next two terms were also correctly predicted by the model to be persistent. In this model, 26% of learners who did not complete the first course and enrolled in the next two terms were also correctly predicted by the model not to be persistent. Of all cases predicted as having learner persistence, 56.8% were correctly predicted. Also, of all cases predicted as not having learner persistence, 55.9% were correctly predicted. Of the four predictor (independent) variables, only application score ($p < .0005$) added significantly to the model/prediction. Pre-course basic verbal score ($p = .279$), degree level ($p = .324$), and start date ($p = .534$) did not add significantly to the model. Learners with higher pre-course verbal score had 1.06 times higher odds to complete the first course and enroll in the next two terms. Similarly, a one-unit increase in application score had 1.29 times higher odds for learners to complete the first course and enroll in the next two terms. Doctoral degree-level learners with the Exp (*B*) value of .90 had lower odds to complete the first course and enroll in the next two terms than master's degree-level learners. Learners who started a course in the second and third months of a quarter had lower odds to complete the first course and enroll in the next two terms than learners who started a course in the first months of a quarter.

In Chapter 5, an overall summary of the study along with conclusions drawn from the data analysis and results of this study will be presented. Implications of this study for current practice and recommendations for further research will be included in the next chapter.

Chapter 5

Conclusions and Discussion

The study set out to examine what learner characteristics could be used to predict learners' persistence to complete their first online course and enrollment in the next two terms. This chapter provides an overview of the study, research questions, summary of the findings, and conclusions drawn from the data analysis. The conclusion of this chapter includes the implications for current practice and recommendations for future research.

This chapter will provide a summary of the study conducted, including a detailed description of the sample, research methodology, and the results of the study. It will then provide analysis of the findings as well as a discussion of these results in light of current education literature, as well as implications for applying the results from this study to current educational practice. While this study provided insight on the issue of learner persistence in an online class environment, there are other research opportunities on the topic. The next section will discuss several recommendations for future research that were suggested by this study. The final section will provide concluding remarks regarding this study and insight by the researcher.

Summary of the Study

This section will provide a summary of the study and discuss the context of the problem as well as list the problem statement and research questions. It will also give a detailed description of the study, data collection, analysis, and the findings of the study.

Context of the study. Garrison (2011) discussed the pedagogical and

technological innovations that are redefining higher education. He noted that quality and cost reduction pressures are creating conditions for this transformation. Many colleges and universities have adapted to this new reality and are offering courses and even complete academic programs online. However, little data exist regarding what learner characteristics significantly influence the likelihood a learner would persist in this online environment.

Problem statement. The purpose of this research was to examine how learner characteristics could be used to predict whether or not a college learner would persist in an online course. The overarching research question guiding the study was: Which learner characteristics can be used to best predict the persistence of college learners in online courses? In order to explore this problem, an examination of the academic and other variables related to the participant's degree level and start date were used to predict a learner's persistence in an online environment.

Research Questions

This study answered the following research questions:

1. What is the significant difference between the characteristics of learners who persist in their first course and learners who drop out of their first course with respect to:

    a. the learner's pre-course basic verbal score

    b. the learner's college application score

    c. the learner's degree level

    d. the learner's start date.

2.   What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first course and enrollment in the next two terms?

Research Design

The following descriptive statistics were used to describe the data: frequency distributions, means, standard deviations, and percentages. To address the first research question, the chi-square test of association, a nonparametric test, was used to discover if there is a relationship between two categorical variables (Airasian & Gay, 2003; Creswell, 2014).

A correlational research design was used to answer the second research question, since the purpose of this study was to determine the combination of variables that could be used to predict the persistence of learners in the first online course and enrollment in the next two terms (Airasian & Gay, 2003; Creswell, 2014). Stepwise logistic regression was used to further analyze the data (Muijs, 2004; Creswell, 2014). The analysis allowed for the identification of a model for determining the probability of persistence of a learner in the first online course and enrollment in the next two terms.

Sample/participants. All participants in this study were enrolled in one of the online graduate programs at this large Midwestern university. The total number of participants was 2,674 online learners. All learners who successfully completed the program admission application process were included in the study. Some learners were exempt from taking the pre-course basic verbal assessment, so there were some data missing. The learners were removed from the final analysis if data were missing for any

independent variable.

Instrumentation. Several types of data were examined in this study. The dependent variable was the learner's persistence in the first course and enrollment in the next two terms. For the purpose of this study, a learner was deemed to be persistent if they enrolled in the first course from April 2013 through March 2014, successfully completed the course, and enrolled in the next two terms. Independent variables, as identified in the literature, were learner goals and aspirations (application score) and academic readiness (pre-course basic verbal score). Other independent variables that interest the researcher but were not suggested in the literature review were the participant's degree level and start date.

Data collection procedures. All data related to a participant's pre-course basic verbal score, application score, degree level, start date, first course completion, and enrollment in the next two terms were obtained from existing graduate program records. The data were collected in Microsoft Excel format from April 2013 through October 2014 terms. The learners who had started their first course in March 2013 could enroll in the next two terms, that is, July and October 2014.

Data analysis. This study was designed to determine which learner characteristic variables can best be used to predict the persistence of college learners in online courses. The researcher exported the dataset into the SPSS for data analysis.

A chi-square test, a nonparametric statistical test, was used to determine if there were any significant differences between variables of the data. The two assumptions were tested and passed for the data before using the chi-square test of association. The

first assumption was that the variables should be measured at an ordinal or nominal level (i.e., categorical data). The second assumption was that the variables should consist of two or more categorical, independent groups.

Using SPSS, the following descriptive statistics were used to describe the data: frequency distributions, means, standard deviations, and percentages. Stepwise logistic regression was used to further analyze the data (Muijs, 2004; Creswell, 2014). The analysis allowed for the identification of a model for determining the probability of persistence of a learner in the first online course and enrollment in the next two terms. The three assumptions were tested and passed before running a stepwise logistic regression, as described in Chapter 4.

Summary of Findings

The tests results showed that there is a statistically significant difference between learners who completed their first course and learners who dropped out of their first course with respect to pre-course basic verbal, application score, and degree level. The logistic regression model was found to be statistically significant: Chi-square = 26.337, *df* = 5, $p < .0005$. Of the four independent variables, only application score ($p < .0005$) added significantly to the model/prediction used to understand whether learner persistence can be predicted based on learner characteristics. This section will synthesize the findings to answer the study's two research questions.

Research question one. The first research question for this study was: What is the significant difference between characteristics of learners who persist in their first course and those of learners who drop out of their first course with respect to:

a. the learner's pre-course basic verbal score

b. the learner's college application score

c. the learner's degree level

d. the learner's start date.

Four independent variables were studied for correlation between them and the first course completion variable. The four independent variables were the learner's pre-course basic verbal score, application score, degree level, and start date. Chi-square tests were used to determine if there were any significant differences between the variables of the data. Tables 4.2 to 4.5 show the numerical differences between the two groups, that is, learners who completed the first course and those who did not complete the first course. A statistically significant difference was found between the two groups in regard to pre-course basic verbal score. Table 4.2 shows that a majority of those learners (69.3%) who completed the first course had moderate (2) or high (3) pre-course verbal scores. A statistically significant difference was also found between the two groups and learner's application score. Table 4.3 shows that 76.5% of those learners who completed the first course had application scores between 0.5 and .699. The two groups of learners had a statistically significant difference in relation to learner's degree level. Table 4.4 shows that the majority of the master's degree-level learners (59.1%) completed the first course. These statistics need to be looked at with caution, as master's degree-level learners comprised 74.9% of the total sample size. Finally, no statistically significant difference was found between the two groups and start date. Table 4.5 shows that most of the learners (42.3%) who started in the first month of a quarter did complete the first

course.

Research question two. The second research question for this study was: What is the relationship between learner characteristics (pre-course basic verbal score, application score, degree level, and start date) and persistence in the first course, and enrollment in the next two terms?

A logistic regression was performed to ascertain the effects of learner's pre-course verbal score, application score, degree level, and start date on the likelihood that participants have persisted in the first course and enrolled in the next two terms. The logistic regression model is statistically significant; however, the model explained only 1.7% (Nagelkerke R^2) of the variance in learner persistence. A Hosmer and Lemeshow test was performed to assess the adequacy of the model. Table 4.8 shows that the Hosmer and Lemeshow test was not statistically significant, indicating that the model is not a poor fit. The model correctly classified 56.6% of cases. The model showed that 82.6% of learners who completed the first course and enrolled in the next two terms were also correctly predicted by the model to be persistent. Of the four predictor (independent) variables, only application score added significantly to the model/prediction, and pre-course basic verbal score, degree level, and start date did not add significantly to the model. Learners with a higher pre-course verbal score had 1.06 times higher odds to complete the first course and enroll in the next two terms. Similarly, a one-unit increase in application score had 1.29 times higher odds for learners to complete the first course and enroll in the next two terms. Doctoral degree-level learners had lower odds to complete the first course and enroll in the next two terms than master's

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degree-level learners. Learners who started a course in the second and third months of a quarter had lower odds to complete the first course and enroll in the next two terms than learners who started a course in first months of a quarter.

Conclusions

This study identified learner characteristics that distinguish learners who completed a first online course from those who do not. These characteristics of course completers or non-completers may help identify prospective at-risk learners. This study was not meant to be a comprehensive analysis of factors that contribute to online learners' successful completion of a first online course at a graduate level institution but to serve as a starting point for future research about learners' readiness for an online learning experience and potential relationship to course completion. These conclusions are worthy of further discussion by practitioners and researchers. As a result of the analysis and subsequent findings, the following conclusions are drawn.

The finding that pre-course verbal score is related to learner persistence was anticipated in light of previous research. These findings support the belief that grade point average and academic readiness are good predictors of future online courses (Hachey et al., 2014; Osborn, 2001). Higher pre-course verbal score may help learners increase their confidence as they complete their online assignments and communicate with instructors and peers.

Application score showed strong association with learner persistence in the first course. Previous studies have found that learner skills, including computer literacy, information literacy, time management, and computer-based interaction, were determined

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to be relevant to learner success in the online environment (McGlynn, 2012; Rovai, 2003). Learners with higher application scores may be better prepared to manage and persevere in an online learning environment.

The finding that learner's degree-level status is related to persistence in the first course needs to be looked at with caution, as master's degree-level learners comprise 74.9% of the total sample size. The number of master's degree-level learners may have contributed to higher persistence for the master's learners as compared to the doctoral learners.

There is no statistically significant difference between learner's persistence in the first course and the start date. It is worth noting that the first month of each quarter is the most popular time for graduate learners to start a first course; however, it is numerically the lowest in learner persistence among the three monthly starts of a quarter.

Of all the learner characteristics proposed in this study, only one—application score—made an important contribution to the logistic regression model. Since the model explained only 1.7% of the variance in learner persistence, this model needs to be used with caution. This study supports the idea that learners who have higher application scores are more likely to complete the first course and enroll in the next two terms.

Implications for Practice

Implicit in the study is the idea that the results should not be used to exclude or discourage potential learners from taking online distance education courses. Rather, the results should help administrators, faculty, and advisers identify at-risk learners and provide them with appropriate learning opportunities, guidance, and support. The results

of this study provide criteria on which customized learner orientation programs and guidance during the first three terms may be developed.

Online courses are not a good fit for all learners, as evidenced by the high attrition rates and low learner success rates in online courses (Hachey, Wladis, & Conway, 2012; Smith Jaggars & Bailey, 2010; Xu & Smith Jaggars, 2013); furthermore, many learners drop out of online institutions during or just after the first course, and first-time online learners represent an at-risk population (Fetzner, 2013; Jones, 2013). Therefore, online educational institution administrators may consider implementing a screening process to identify and delineate learners who are most likely to be successful and those who are at risk in an online course, including an assessment of technical knowledge as well as skills that support academic success, such as time management and reading strategies (McGlynn, 2012).

An important implication of this study is for learner support intervention. As supported by previous research, this study shows graduate learner's pre-course basic verbal score (entry scores) and application score (high self-efficacy, time management skills) are related to higher learner persistence in the first online course. Online higher education institutions need to make realistic appraisals of the academic demands of the first course and create cohorts of learners based on their pre-course basic verbal and application scores. To support each cohort, specialized enhancement programs need to be introduced and evaluated to provide learners with additional skills based on their pre-course basic verbal and application scores.

Limitations of the Study

There were limitations to this study that should be considered in interpreting its results, meaning they can only cautiously be generalized to other similar settings. The population for this study was composed entirely of graduate learners in the field of public service and health. The participants were drawn from only a single university.

It was assumed that the information on the applications for admission was accurately completed by the learner. Also, it is important to emphasize that this research included a limited number of variables even though they were chosen for their importance based on review of the literature. Many other variables were not taken into account by which participants in the study could have been influenced. These variables include, but are not limited to, course design, teaching styles of instructors, instructor experience, student learning style, and external factors such as illness, death of a family member, and financial concerns.

Recommendations for Future Research

This study examined four learner characteristics to predict learners' persistence in their first online course and enrollment in the next two terms. Of the four learner characteristics studied, learners with higher pre-course basic verbal and application scores persisted statistically significantly better in their first course. This study supports the idea that learners who have higher application scores are more likely to complete the first course and enroll in the next two terms.

Although the present study examined persistence in a specific population (public health and services graduate learners) that has been addressed in fewer research

studies, there are other variables which could be studied to further understand the relationship between learner characteristics and persistence in the first online course and enrollment in the next two terms. More information on characteristics of learners, such as learning styles, computer experience and access, previous online experience, socioeconomic status, and self and parents' education level, could be included. An increased knowledge of the learner characteristic factors that contribute to higher persistence might also assist educators to develop and implement specific intervention programs.

Additional research should be conducted using a qualitative methodology to interview learners who completed and did not complete the first course and enrolled in the next two terms. This will provide a deeper understanding of the four learner characteristics used in this study as well as other variables related to persistence.

This study was able to account for 1.7% of the total variance in explaining or predicting learner characteristics related to first online course completion for the sample of learners. Additional quantitative studies should also be conducted to try to explain more of the variance. These studies should include a wider sample of universities and should look at different variables believed to be related to course completion, including learner factors (e.g., psychological attributes, academic background), course factors (e.g., institutional support, course design), and environmental factors (e.g., work commitments, family obligations).

In summary, additional research studies are recommended to gain insight into the impact of learner characteristics on learners' ability to successfully complete a first online

course and enroll in the next two terms. The findings of this study can contribute to the

scholarly work in the field and potentially provide the base for future interventions to

improve learner persistence in first online course and enrollment in the next two terms.

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