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Perceived Connectivity, Perceived Internal Locus of Control, and Age as Predictors of Persistence in Online Master's Degree Programs

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
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Abstract

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MPhil, Walden University, 2021

MA, National Louis University, 2010

MA, National Louis University, 1993

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Persistence in distance learning has become problematic. This quantitative nonexperimental study examined whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. Rotter's locus of control theory, Moore's transactional distance theory, and Rovai's composite persistence model provided the theoretical and conceptual frameworks. A sample of 68 participants completed a survey comprised of the Online Student Connectedness Survey, the Internal Control Index, the Grit Scale, and demographic questions. The findings of the multiple linear regression indicated that the predictor variables, connectivity, internal locus of control, and age, had a statistically significant relationship with the criterion variable, persistence. The R square value indicated that 27.9% of the variability in the criterion variable was explained by the combination of the predictor variables. The effect size for the regression model, the adjusted R square value, indicated that 24.5% of the variability of the criterion variable was explained by the combination of the three predictor variables. The findings of the Independent Samples *t*-Test indicated that the means varied for the three predictor variables between the two completed education levels, bachelor's degree, and master's degree, respectively. Persisting until completion of an advanced online degree program benefits learners and postsecondary institutions, as well as society. Advanced online degree completion promotes positive social change. It enhances the employment prospects of individuals from diverse backgrounds. Moreover, individuals who complete their advanced online degree programs gain the requisite knowledge and skills needed to improve conditions within their communities.

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Dedication

I want to give thanks to the heavenly father for all his blessings as I worked to attain my Ph.D. My thanks and appreciation to my husband, Willie, for all his support and encouragement through the years. I also want to thank my children Tiffany, William, and Heather, my son-in-law, David, my mother-in-law, Mamie, and my dear friend, Dr. Dorenda Dixon, for their encouragement to complete my program.

My thanks also go to my mother and father who instilled the importance of an education. Also, my thanks to my father-in-law for his encouragement to complete my program, and my sister, who inspired a love of reading in me as a child that continues to this day.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Introduction

Persistence in distance learning has become problematic. In the context of adult education, persistence relates to how long adults attend their courses (Rovai, 2003). In this study, persistence pertains to learners enrolling in an online degree program until program completion.

Findings from a number of studies have indicated that rates of persistence for courses delivered online continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019). Accordingly, developing approaches to ameliorate persistence has gained importance. Moreover, the rapid growth of distance learning courses, along with their attendant low rates of persistence, is an issue that ought to be highly relevant to learners, educators, and postsecondary institutions (Lakhal et al., 2021).

This chapter identifies the gap in the research that explains why the study is needed. It also provides background and the problem statement. In addition, this chapter presents the research questions and hypotheses, the theoretical and conceptual frameworks, the nature of the study, its significance, terms and definitions, assumptions, scope and delimitations, and limitations.

Background

In this study, I examined whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. Connectivity, as conceptualized by Schroeder et al. (2016), is learners' perceptions of community as

well as involvement in distance settings. This corresponds to Gallien and Oomen-Early's (2008) description of connectedness. Connectedness relates to an individual's perceptions of belonging or perceptions of presence or support, as well as the extent of communication or interactivity with the instructor (Gallien & Oomen-Early, 2008).

Jamison and Bolliger (2020) stated that study findings have indicated that a high degree of connectedness and interactivity is associated with increased retention as well as learner satisfaction in courses that are offered online. LaBarbera (2013) cited other researchers who felt that retention in distance learning could be reinforced by learners experiencing an increased perception of connectedness or community with other learners and faculty. In addition, other study findings have indicated that feeling connected lessens perceptions of isolation and improves academic performance and program completion (Jamison & Bolliger, 2020).

Lee et al. (2013) used Rovai's (2003) composite persistence model for their study's theoretical framework. This model was composed of internal factors, and Lee et al. stated that locus of control is one of the factors that predicts persistence in online courses. Gokcearslan and Alper (2015) conducted a study to ascertain how locus of control influences certain aspects of behavior such as individuals' feelings of community in online programs as well as their academic performance. Gokcearslan and Alper cited findings of previous studies which indicated that locus of control influences various aspects of online learning.

Individuals' perceptions of control can be either internal or external. Individuals with internal perceptions of control attribute outcomes, good or bad, to their own

behavior. Conversely, individuals with external perceptions of control attribute outcomes to external events, the environment, or other individuals (Lee & Choi, 2011). Rotter (1990) called these internal and external perceptions a locus of control. Lee and Choi (2011) stated that previous research findings have indicated that an internal locus of control is predictive of learner persistence and completion in online courses. In addition, Lee et al. (2013) stated that findings from numerous studies have indicated that an internal locus of control correlates positively with persistence in an online setting.

Rovai's (2003) composite model of persistence included age as one of the learner attributes related to persistence in distance learning. Lakhal et al. (2021) stated that findings from earlier studies varied on how age or other learner attributes influence persistence in courses delivered online. Lakhal et al. examined various factors, including age, to ascertain whether they have an effect on persistence in postsecondary distance learning courses. For one analysis, the participants were divided into two groups based on their ages. In one group, participants were 25 years old or younger (n = 300). In the second group, the participants were 26 years old or older (n = 459). The findings indicated that learners' satisfaction in distance learning courses had a greater effect on persistence among learners who were older and learners who had previous experience with distance learning courses (Lakhal et al., 2021).

Problem Statement

Persistence in distance learning has become problematic. Distance learning programs at universities and colleges have expanded and are now commonly used to deliver instructional content (Milman et al., 2015). Findings from recent studies have

shown that 29% of learners in the United States enrolled solely in distance learning courses (Ginder et al., 2018). However, findings from various studies have indicated that rates of persistence for such courses continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019).

Learners in online courses are separated physically, which differs from learners in traditional courses (Bollinger & Inan, 2012; Jamison & Bolliger, 2020; Rovai & Wighting, 2005). Participating in courses and connecting with faculty and other learners requires additional effort (Jamison & Bolliger, 2020). Because of this, connectivity has become an integral aspect of online learning environments where online presence must be established. Connectivity, as described by Schroeder et al. (2016), is learners' perceptions of community as well as involvement in distance settings. However, the gap in the research of whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs has not been examined.

The Purpose of the Study

Persistence has become problematic in distance learning. The purpose of this quantitative nonexperimental study was to examine whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. The predictor variables were perceived connectivity, perceived internal locus of control, and age. The criterion variable was persistence. The predictor variables, as well as the criterion variable, were measured as continuous variables (Segrin, 2012).

Research Questions and Hypotheses

RQ1: To what extent will perceived connectivity predict persistence in online master's degree programs?

$H_0$1: Perceived connectivity will not predict persistence in online master's degree programs.

H_A1: Perceived connectivity will predict persistence in online master's degree programs.

RQ2: To what extent will perceived internal locus of control predict persistence in online master's degree programs?

$H_0$2: Perceived internal locus of control will not predict persistence in online master's degree programs.

H_A2: Perceived internal locus of control will predict persistence in online master's degree programs.

RQ3: To what extent will age predict persistence in online master's degree programs?

$H_0$3*:* Age will not predict persistence in online master's degree programs.

H_A3: Age will predict persistence in online master's degree programs.

RQ4: To what extent will the means vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program?

$H_0$4: The means will not vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

H_A4: The means will vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

Theoretical and Conceptual Frameworks

This quantitative study with a nonexperimental design was grounded by theoretical frameworks from Rotter's (1966) locus of control theory and Moore's (1997) transactional distance theory; Rovai's (2003) composite persistence model provided the conceptual framework. Rotter conceptualized locus of control to explain how individuals develop expectancies, or expectations, in situations based on how the expectancies are reinforced. Rotter developed a scale for measuring and assessing locus of control, external and internal. Findings from myriad studies have indicated that internal locus of control correlates positively to persistence in distance learning environments (Lee et al., 2013). Similarly, Joo et al. (2013) stated that learners with an internal locus of control have a strong resolve to carry on with their education.

Moore (1997) posited that learners and instructors in distance learning courses are geographically separated, which can result in psychological gaps as well as misinterpretations between learners and instructors. Moore called this transactional distance and discussed how increased discourse could bring about lower transactional distance and lessen learners' perceptions of isolation. Bolliger and Halupa (2018)

explained that distance learners experience a higher rate of dropout, which may be caused by transactional distance. Bolliger and Halupa posited that distance learners' engagement can help minimize transactional distance and avert isolation, as well as dropout.

Rovai (2003) constructed a composite model to explain attrition and persistence for nontraditional learners in distance learning programs. Rovai related that a lack of sense of community corresponds to learners feeling isolated or less connected in their distance courses. In Rovai's composite model of persistence, age is one the learner attributes related to persistence in distance learning. In Chapter 2, I present a review of the literature relating to internal locus of control, transactional distance, and connectivity, and their relevance to persistence in online master's degree programs.

Nature of the Study

This quantitative nonexperimental study examined whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. I collected cross-sectional data via three survey instruments and demographic data which the study participants provided. To analyze the data, I used multiple linear regression. Individuals' perceived connectivity, perceived internal locus of control, and age, continuous predictor variables, were measured. Persistence was the continuous criterion variable that was measured. Predictor variables and criterion variables in a multiple linear regression can be measured as continuous variables (Segrin, 2012). The participants were individuals who have completed an online master's degree program within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years.

The participants answered four questions which provided demographic information for the study. The participants provided their age, highest completed level of education (bachelor's degree or master's degree), gender, and preferred instructional format. I performed an Independent Samples *t*-Test to see if the means varied for the continuous predictor variables (connectivity, internal locus of control, and age) between the two completed education levels, bachelor's degree and master's degree, respectively.

Significance

Choi and Park (2018) related that online course delivery has expanded appreciably. However, findings from various studies have indicated that rates of persistence for such courses continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019). Moreover, the rapid growth of distance learning courses, along with their attendant low rates of persistence, is an issue that ought to be highly relevant to learners, educators, and postsecondary institutions (Lakhal et al., 2021).

Determining the learners' completion rate is, to some extent, a way of establishing the quality of a program (Willging & Johnson, 2004). Lower retention rates in programs negatively affect efforts toward recruiting students and promoting programs (Willging & Johnson, 2004). Low levels of retention are ascribed to lower performance within postsecondary institutions. This can impact such institutions' capacity to obtain government-related funding (Haydarov et al., 2013).

This study could provide insights that would help researchers, online educators, online course designers, and online program administrators to improve the quality of

design practices and pedagogic practices in distance learning programs and ameliorate persistence and graduation rates. Persisting until completion of an advanced online degree program benefits learners and postsecondary institutions, as well as society. Advanced degree completion promotes positive social change. It enhances the employment prospects of individuals from diverse backgrounds. Moreover, individuals who complete their advanced online degree programs gain the requisite knowledge and skills needed to improve conditions within their communities.

Terms and Definitions

Asynchronous communication: This type of communication can occur any time and does not require interactions to occur in actual time simultaneously, such as email, online discussions, and blogs (Croxton, 2014).

Attrition: Learners in a course or program gradually decrease in total (Haydarov et al., 2013).

Connectedness: In courses delivered online, connectedness involves interaction among learners, faculty, and peers, working interdependently to attain objectives for learning (Jamison & Bolliger, 2020). Green et al. (2017) stated that findings from previous studies have substantiated the idea that learners' connectedness relates to positive outcomes and persistence.

Connectivity: Schroeder et al. (2016) conceptualized connectivity as learners' perceptions of community as well as involvement in distance settings.

Interactivity: Interactivity is involved in varying circumstances and may be asynchronous as well as synchronous. Some modes of interactivity are interaction

between instructor and student, student and student, and student and technology (Singh & Thurman, 2019). Croxton (2014) explained that interactivity within online courses involves interaction that is formal as well as informal. Interactivity that is formal involves interactions between learners, learners and the instructor, and learners and the course content (Croxton, 2014). Interaction that takes place informally includes similar aspects (Croxton, 2014).

Internal locus of control: Internal locus of control, according to Armstrong et al. (2021), is the idea that the capacity to attain results is attributable to one's behavior. Lee and Choi (2011) explained that individuals with an internal locus of control perceive that their behavior is a determinant of outcomes in their lives. In addition, findings from previous studies have indicated that learners with an internal locus of control tend to persevere and finish their online classes (Lee & Choi, 2011).

Isolation: According to Sorensen and Donovan (2017), learners can feel disconnected and isolated in the course when instructors lack presence in the online course, interact infrequently with learners during discussions, or provide insufficient feedback regarding assignments. Armstrong et al. (2021) explained that motivation is an important aspect of online settings because learners experience isolation along with diminished interactivity and support from other learners as well as the instructor. However, when learners perceive a connection to other learners in an online setting, their perceptions of isolation are minimized, which can lead to program completion (Jamison & Bolliger, 2020).

Online learning: Singh and Thurman (2019) analyzed numerous, widely used definitions from literature pertaining to online learning. They explained that such learning is characterized by several main facets: technology, time, interactivity, distance that is physical, and the educational setting (Singh & Thurman, 2019). Online learning can be carried out via the Internet or computers that are online. It can occur in a classroom that is synchronous, or a setting that is asynchronous, and does not rely on learners being physically located in the same space (Singh & Thurman, 2019).

Persistence: In terms of persistence in courses delivered online, there is no consensus among researchers and postsecondary institutions for a single definition (Lakhal et al., 2021). Lakhal et al. (2021) explained that the ways in which persistence is defined vary from study to study. In the context of adult education, Rovai (2003) related that persistence pertains to how long adults attend their courses. Verdinelli and Kutner (2016) stated that persistence, within an online setting, is a concept that is multifaceted. It relates to a learner's postsecondary efforts to achieve educational goals and graduate. Glazer and Murphy (2015) described persistence as successfully finishing courses as well as enrolling continuously. In addition, Hart's 2014 review of literature on persistence in online courses explored persistence as an occurrence that involves myriad aspects and brings about completion of a program that is delivered online. In this study, persistence pertains to learners enrolling in an online degree program until program completion.

Retention: This term refers to whether an institution can maintain student enrollments (Haydarov et al., 2013).

Synchronous communication: This type of communication occurs in actual time, such as chats taking place online and video conferencing (Croxton, 2014). Daily-Herbert (2018) explained that interaction in online courses may be synchronous; it takes place in actual real time. Learners can have real-time chats or participate in video conferences or webinars. Synchronous interactions also allow learners to collaborate, receive instructor feedback without delays, talk to instructors during their office hours, and participate in realities that are virtual or augmented.

Assumptions

I assume that the individuals I recruited for this study met the criteria for inclusion in the study. I also assume they responded accurately and truthfully. They completed a master's degree from an online program within the last 5 years, or they enrolled in, but did not complete, an online master's degree program within the last 5 years. I also assume the quantitative design and methodology I used were appropriate for the study. These assumptions underlie the aim of the study, which was to examine whether learners' perceived connectivity, perceived internal locus of control, and age predict persistence within an online master's degree program.

Scope and Delimitations

The scope of this quantitative study focused on the independent variables, perceived connectivity, perceived internal locus of control, and age, and the dependent variable, persistence. The study examined whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. This study was delimited to individuals who have completed an online master's degree

program within the last 5 years or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years.

Limitations

To obtain participants, I used convenience sampling. Convenience samples are a type of nonprobability sampling and tend to be less generalizable. Consequently, it may be difficult to ascertain if the sample selected represents the population that is under study (Bigsby, 2018). In addition, using a nonprobability sample can cause difficulties in determining sampling error and finding to what extent the sample is similar to, or differs from, the target population (Bigsby, 2018).

Summary

Persistence has become problematic in distance learning**.** Findings from a number of studies have indicated that rates of persistence for courses delivered online continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019). Accordingly, developing approaches to ameliorate persistence has gained importance. Moreover, the rapid growth of distance learning courses, along with their attendant low rates of persistence, is an issue that ought to be highly relevant to learners, educators, and postsecondary institutions (Lakhal et al., 2021).

Learners in online courses are separated physically, which differs from learners in traditional courses (Bollinger & Inan, 2012; Jamison & Bolliger, 2020; Rovai & Wighting, 2005). Consequently, connectivity is an integral aspect of online learning environments where online presence must be established. The gap in the research is

whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. Schroeder et al. (2016) described connectivity as learners' perceptions of community as well as involvement in distance settings.

This quantitative study with a nonexperimental design was grounded by theoretical frameworks from Rotter's (1966) locus of control theory and Moore's (1997) transactional distance theory, and the conceptual framework provided by Rovai's (2003) composite persistence model. Findings from myriad studies have indicated that internal locus of control correlates positively to persistence in distance learning environments (Lee et al., 2013). Similarly, Joo et al. (2013) stated that learners with an internal locus of control have a strong resolve to carry on with their education.

Moore (1997) posited that learners and instructors in distance learning courses are geographically separated, which can result in psychological gaps as well as possible misinterpretations between learners and instructors. Moore called this transactional distance and discussed how increased discourse could bring about lower transactional distance and lessen learners' perceptions of isolation. Bolliger and Halupa (2018) explained that distance learners experience a higher rate of dropout, which may be caused by transactional distance. Bolliger and Halupa posited that distance learners' engagement can help minimize transactional distance and avert isolation, as well as dropout.

Rovai's (2003) composite model was used to explain attrition and persistence for nontraditional learners in distance learning programs. Rovai's composite model of persistence included age as one of the learner attributes related to persistence in distance

learning. Rovai explained that a lack of sense of community corresponds to learners feeling isolated or less connected in their distance courses.

This study is important because persistence in distance learning has become problematic. Low levels of retention are ascribed to lower performance within postsecondary institutions. This can impact such institutions' capacity to obtain government-related funding (Haydarov et al., 2013). This study could provide insights that would help researchers, online educators, online course designers, and online program administrators to improve the quality of design practices and pedagogic practices in such programs and ameliorate persistence and graduation rates.

Persisting until completion of an advanced online degree program benefits learners and postsecondary institutions, as well as society. Advanced degree completion promotes positive social change. It enhances the employment prospects of individuals from diverse backgrounds. Moreover, individuals who complete their advanced online degree programs gain the requisite knowledge and skills needed to improve conditions within their communities.

Chapter 2 begins with an introduction of the aim of the quantitative study. The chapter presents the literature search strategies and theoretical and conceptual framework for the study. Issues that appertain to distance learning such as connectivity, persistence, retention, engagement, community, attrition, and isolation in distance education are also discussed.

Chapter 2: Literature Review

Introduction

Persistence has become problematic in distance learning. The aim of this quantitative nonexperimental study was to examine whether distance learners' perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. This review of the literature was informed by a discussion of Rotter's (1966) locus of control theory, Moore's (1997) theory of transactional distance, and Rovai's composite persistence model (2003), all of which provided a theoretical and conceptual framework for this study.

Strategies for the Literature Search

The electronic databases I used to conduct a search for literature included the following: Academic Search Complete, Education Source, PsycARTICLES, and PsycINFO. Reviewing the references pages of pertinent articles was also useful for finding additional resources. In addition, I used Google Scholar to search for relevant articles.

The literature search was limited to articles that were scholarly and from peer-reviewed journals. Most of the research literature was limited to the last 5 years. Other articles were included that were older than 5 years; they provided important background information. Some earlier literature was also used to provide the theoretical framework for the study.

Locus of Control

Rotter derived the concept of locus of control from a theory of social learning he developed in 1954 (Rotter, 1966). In this theory, a reinforcement takes place after a certain behavior or occurrence, which builds an expectancy for that reinforcement to occur at a subsequent time (Rotter, 1966). Rotter conceptualized locus of control to explain how individuals develop expectancies, or expectations, in situations based on how the expectancies are reinforced. Some individuals feel that outcomes are contingent upon their own actions. Those individuals, according to Rotter, believe in control that is internal. Others may ascribe an outcome to forces outside of themselves; they believe that control is external. Rotter (1966) referred to such individuals, respectively, as internals or externals and developed a scale for measuring and assessing locus of control, external and internal.

Academic Performance

Individuals' perceptions of internal or external locus of control can impact academic performance. Lee and Choi (2011) explained that individuals with an internal locus of control perceive that their behavior is a determinant of outcomes in their lives. Learners with an internal locus of control that is high tend to have higher levels of self-regulation as well as self-motivation (Lee & Choi, 2011). In addition, findings from previous studies have indicated that learners with an internal locus of control tend to persevere and finish their online classes (Lee & Choi, 2011).

Gokcearslan et al. (2015) conducted a study to ascertain how locus of control influences certain aspects of individuals' behavior in distance learning. The authors

related that locus of control influences various facets of individuals' distance learning experience. Locus of control can affect how well they adjust to an online environment and perform in such an environment. The extent of how learners attend and participate in their online courses, as well as how they feel about such courses, is influenced by their locus of control. Moreover, the findings of multiple studies have indicated that locus of control exerts an influence on learners' capacity to finish their online education (Gokcearslan et al., 2015).

Moore's Transactional Distance Theory

Moore (1997) posited that learners and instructors in distance learning courses are geographically and temporally separated. He conceptualized this separation as transactional distance. Moore explained that transactional distance is an idea that is pedagogic. It characterizes how the interactions between instructors and learners in online environments can result in psychological gaps as well as possible misinterpretations. Moore asserted that transactional distance could occur in any learning environment-traditional classrooms or online. However, it is important to note that learner dropout occurs at a higher rate in online courses compared to face-to face ones (Bolliger & Halupa, 2018). Transactional distance is consequential because it is regarded as a cause of learner dropout in online courses (Bolliger & Halupa, 2018).

Communication is influenced by varying aspects of the learning environment; consequently, transactional distance is also affected. For example, the number of learners the instructor is working with remotely, the physical setting where instruction takes place, how often it is possible to communicate, or the level of interactivity between learners and

instructors are all considerations (Moore, 1997). Moore (1997) stated that computers have facilitated asynchronous interactions between learners and instructors with videoconferences and conferences via computer (such as text-based discussions). Synchronous or asynchronous group discussions have made it possible for students to learn from each other or learn with or independently of their instructors (Moore, 1997).

Minimizing the Distance

Bolliger and Halupa's 2018 study investigated how learners perceived transactional distance and engagement in their online classes. The authors related that technological advancements allow synchronous meetings to be included in online classes. This can minimize transactional distance. However, this is not analogous to settings where learners and instructors are physically at the same place at the same time. Distance learning has not yet reached that point (Bolliger & Halupa, 2018). For that reason, researchers have sought to find ways to minimize transactional distance in online settings. Myriad strategies can be utilized to improve communication, increase discourse, bring about lower transactional distance, and lessen learners' perceptions of isolation. Smith Jaggers and Xu (2016) stated that interactions between learners might lessen transactional distance and promote social presence in the course. Kassandrinou et al. (2014) explained that information and communication technology utilize cooperative tools, such as teleconferences. Kassandrinou et al. stated that teleconferences could foster online learning communities when integrated with face-to-face group meetings. This could help to lessen transactional distance. Nwankwo (2013) discussed findings from his study which indicated that an inverse relationship exists between instructors' level of

experience and a reduction in transactional distance. Similarly, Bollinger and Halupa's 2018 study presented findings which indicated an inverse relationship between learners' increased levels of engagement and a lessening of transactional distance. Such results have important implications for instructors and designers of distance learning courses.

Other Perspectives

Some researchers do not agree that transactional distance presents barriers in terms of distance learning. Paul et al. (2015) related that learners' access to the Internet has become unparalleled. As a result, Paul et al. asserted that distance is no longer a physical aspect of transactional distance that hinders interaction between instructors and learners. Some facets of transactional distance, however, are not physical. These types of distance may relate to perceptions or emotions which can impede knowledge acquisition in online courses. Such barriers could relate to the type of interactions between learners and faculty, the tone of such interactions, or how often learners interact during discussions (Paul et al., 2015). Paul et al. concluded that Moore's theory is pertinent to contemporary online settings, but it needs to be measured by a different model. The authors suggested that the scale developed by Zhang (2003), which measured barriers to transactional distance, be revised since it is a sound instrument (Paul et al., 2015). Kassandrinou et al. (2014) also contended that geographic separation should not be regarded as an obstacle in online courses since technologies used for information and communication such as computers, laptops, or software enable learners in online courses to communicate, interact, and collaborate. However, after Kassandrinou et al. conducted their 2014 study, they concluded that transactional distance was discerned as a barrier.

The study participants were geographically distant from each other and had little interaction.

Rovai's Composite Model

Rovai's (2003) composite persistence model was used to explain attrition and persistence for nontraditional learners in distance education programs. Several models were combined to create Rovai's composite persistence model. Rovai synthesized models of persistence from Tinto (1975, 1987, 1993) and Bean and Metzner (1985), and incorporated online learners' needed skills (Cole, 2000; Rowntree, 1995), Workman and Stenard's (1996) research on needs relevant to distance learners, and Grow's (1996) research on coordinating learning and instruction styles (Rovai, 2003). This resulted in a model that considers learners' skills before admission to an academic institution and factors, external as well as internal, that impact them afterwards (Rovai, 2003).

Attrition in distance learning programs is a complex matter and involves an interplay between factors affecting individuals as well as institutions (Waugh & Su, 2018). Waugh and Su (2018) stated that attrition may continue to be an issue in online education. However, Rovai's (2003) model offers guidance for institutions considering aspects of their programs that could adversely affect other important learner attributes (Waugh & Su, 2018).

Rovai (2003) stated that persistence refers to how long adults attend their courses. He explained that persistence is a major concern for programs at the postsecondary level. Nontraditional learners tend to be retained at lower rates compared to traditional ones, and their numbers have risen in online programs. In addition, the government has focused

attention on retention rates. Low levels of retention are ascribed to lower performance within postsecondary institutions. This can impact such institutions' capacity to obtain government-related funding (Haydarov et al., 2013). Furthermore, lower retention rates in programs negatively affect efforts toward recruiting students and promoting programs (Willging & Johnson, 2004).

Connectivity in Online Programs

Connectivity, Retention, and Persistence

Persistence, in a distance education context, may result from the level of interactivity between learners and instructors (Croxton, 2014). Schroeder et al.'s 2016 study investigated graduate learners' experiences with connectivity in an asynchronous, online program. Schroeder et al. (2016) conceptualized connectivity as learners' perceptions of community as well as involvement within the online setting. Jamison and Bolliger (2020) asserted that learners' perception of community is essential to having a connection to distance courses. Having a perception of community enhances performance in distance education. Jamison and Bolliger (2020) explained that learners in distance education lack a physical presence, so making connections with instructors or other learners requires more effort.

Schroeder et al. (2016) related that retention has been problematic in online programs despite their continuous expansion. Some of the factors that contribute to unsatisfactory retention in online courses include learners not feeling connected to, or supported by, their academic institution, feeling isolated or disconnected, or having problems utilizing technology (Schroeder et al., 2016). Schroeder et al.'s 2016 study

emphasized that learners' connectivity pertained to feeling connected and involved in the online setting. Instructor presence, which includes communicating often in ways that are relevant to learners (Reupert et al., 2009), helps to create such an environment. Schroeder et al. (2016) found that the learners wanted a higher level of connectivity with their instructors and advisors. However, most of the learners did not desire a high level of connectivity with other learners in their program. Connectedness in distance programs is enhanced by collaboration and can result in persistence (Laux et al., 2016). Laux et al. (2016) maintained that learners who feel connected with their groups tend to engage effectively and perceive a greater level of involvement with their program. Collaborative learning in online settings has been shaped by social constructivism, where learners enhance how they construct knowledge by interacting with others (Laux et al., 2016).

Connectivity and Online Identity

Delahunty et al. (2014) discussed how interaction, individuals' feelings of community, and the development of identity are facets of distance learning. Delahunty et al. stated that these features contribute to how individuals interact with others in online settings. They explained that individuals construct their identities as part of an online community, which has an effect on how they experience distance learning. Researchers have found that learners' participation strongly relates to interaction and perceptions of community. Ragusa and Crampton (2018) stated that learners' access to online education has grown widely, and the ways that connection and identity contribute to learners' success have gained relevance. Ragusa and Crampton conducted a mixed methods study to obtain data about undergraduates taking online courses at a university in Australia. The

authors wanted to better understand whether participants' perceptions of identity and connection in the courses influenced their experiences. Their findings indicated that almost 80% of the participants felt that connectedness contributed to their course performance.

Connectivity and Course Design

Green et al. (2017) looked at previous studies with a focus on aspects of distance learning that bring about success. One aspect that was frequently pointed out was learners' need to interact and communicate in ways that help them to feel connected. Connectedness was an important aspect of a mixed methods study that Green et al. conducted with graduate students from cultures that were high or low context. Green et al. investigated the extent to which participants perceived being connected to other students, their instructors, and their program. They found that features relating to how programs and courses are designed resulted in feelings of connectedness. For example, varying the means of communication and the uniformity of such communication (Green et al., 2017). This finding is supported by research from Smith Jaggars and Xu (2016). Smith Jaggars and Xu noted that instructors who interacted frequently and effectively with learners in varying modes promoted learners' connection and performance in their courses. Green et al. stated that findings from previous studies have substantiated the idea that learners' connectedness relates to positive outcomes and persistence. Green et al. pointed out that the findings of their study were relevant to research pertaining to distance learners' persistence and achievement. Learners who persist in distance education are usually those who experience feelings of connectedness (Green et al., 2017).

Connectivity and Instructor Presence

Online instructors strive to promote social presence, in that learners feel that others are present during online communications. Social presence diminishes perceptions of being isolated, disconnected, or separated (Phirangee & Malec, 2017). Joyner et al. (2014) explored how faculty presence in online graduate programs could facilitate learners' adjustment to such programs. Researchers have consistently noted that online learners tend to encounter feelings of isolation more often than those who attend classes on a campus (Joyner et al., 2014). Joyner et al. stated that connections between students and their instructors are central to retaining learners in traditional and online settings.

Jamison and Bolliger (2020) also discussed the importance of connectedness in online courses. Jamison and Bolliger stated that learners who perceive a connection to others in their distance courses feel less isolated and are likely to make academic progress and finish their programs. Perry and Steck (2019) also found that prompt and meaningful responses from instructors to online learners fosters persistence in addition to engagement. When learners can interact consistently with instructors, they experience lower levels of disconnectedness and more sense of community in a transactional learning setting (Perry & Steck, 2019). Perry and Steck explained that online instructors' use of synchronous interaction has become more common. For instance, instructors can hold virtual office hours by using online conferences or chat. Perry and Steck pointed out that online learners tend to use such communications less frequently. Email or communication that is text-based is more widely used, but it can require more time and involves delayed responses.

Joyner et al. (2014) cited earlier studies which substantiated that connectivity between learners and instructors influenced learners' performance. Researchers have found that connectedness strongly corresponds to learners' academic progress in distance education (Jamison & Bolliger, 2020). Giving learners prompt feedback, taking part in activities, and promoting communication, helps online instructors to create an environment of connectedness among learners (Shepherd & Bolliger, 2019). Jamison and Bolliger (2020) asserted that connectedness is effective when learners and instructors interact in a relevant manner. In a distance course, learners may not be able to have synchronous discussions with their instructors or other learners (Jamison & Bolliger, 2020). Joyner et al. explained that instructor presence in graduate distance courses can be established by varying modes of interaction such as email, office hours, and lectures via video or audio. In addition, synchronously communicating with chat can help learners engage in the course with instructors and other learners (Joyner et al., 2014).

Retention and Persistence in Distance Education

The Importance of Retention

Muljana and Luo (2019) reviewed multiple studies pertaining to retention in distance education. Findings have indicated that enrollments in distance education have continually increased due to its popularity. However, the rate at which online learners complete their studies is far lower than those who are in traditional settings (Muljana & Luo, 2019). Institutions that offer online programs are negatively impacted by low retention because such programs could be viewed as ineffectual. Furthermore, being unable to persist in an online course may deter a learner from taking a subsequent one

(Muljana & Luo, 2019). Berry (2018) discussed how enrollment has increased for learners in online graduate programs, but their experiences during their first year have not received much attention. Berry explained that the first year is extremely important to learners' positive outcomes as well as retention. Berry conducted a qualitative study to explore how an orientation taking place over three days influenced graduate learners' sense of community in their online program. Berry's findings indicated that learners' interactions during the orientation played a part in developing their sense of community. In addition, findings from previous studies have indicated that orientations in distance programs have been linked to higher levels of engagement as well as retention (Berry, 2018).

Persistence and Interaction

Gaytan's 2015 study compared instructors' and learners' perception of factors that impact learner retention in distance courses. Gaytan's (2015) findings indicated that online instructors felt that the quality of the interactions between instructors and learners was a factor impacting learners' retention. Researchers in previous studies have reported similar findings. The learners felt that relevant feedback was more important. For example, they usually only received a grade for coursework, but wanted more feedback about how they could improve their performance (Gaytan, 2015). Instructions and learners also differed in their ratings of the quality of instructor- learner interactions. The online instructors equated high-level interactions with prompt feedback provided a few times weekly. The learners, however, felt that high-level interactions were those that

included suggestions for improving their performance and enriching their skills (Gaytan, 2015).

Milman et al. (2015) related that the widespread presence of distance programs has necessitated a better understanding of the factors, internal as well as external, that ameliorate online learners' persistence. However, the characteristics of learners in graduate distance programs differ greatly from undergraduates in face-to-face-settings (Haydarov et al., 2013). Milman et al. examined how administrative and faculty support of learners in an online master's degree program could promote satisfaction and persistence. Milman et al. found that connecting, as well as interacting, with instructors, advisors, and other learners were some supports that were deemed as key by the highest number of participants Milman et al. surveyed.

Some researchers have contended that being physically separated can result in learners feeling isolated and alienated in online programs (Rovai & Wighting, 2005). Rovai and Wighting (2005) examined perceptions of alienation and low perceptions of community to explain low persistence rates in online programs. More than 115 learners in several online graduate courses completed a self-report. The findings of their study indicated that alienation and perceptions of community were inversely related.

Persistence and Social Presence

Richardson et al. (2015) described social presence as the extent to which learners perceive a connection to other learners in a virtual community. Social presence, Kear et al., (2014) maintained, is central to distance learning. Kear et al. stated that many learners require a feeling of being connected with others to discuss ideas and collaborate. When

there is insufficient social presence, disengagement can result. Learners may leave the online setting (Kear et al., 2014). Lee and Huang (2018) also affirmed the value of social presence to online learners. Lee and Huang stated that online learners may experience feelings of isolation when there is not enough social interaction.

Retention, motivation, perceptions of learning, and participation in online courses are influenced by social presence (Richardson et al., 2017). Richardson et al. (2017) conducted a meta-analysis of factors from other studies to look at how social presence and learner outcomes relate to each other in varying contexts, disciplines, and ways of measuring social presence. Richardson et al. discussed how instructors could utilize teaching strategies to promote social presence in their online courses. Trespalacios and Lowenthal (2019) stated that building and sustaining social presence in online courses could help learners feel less isolated, which could also help them to persist. Moreover, social presence plays a part in effective collaboration as well as satisfaction with distance courses (Oregon et al., 2018).

Persistence and Community

Earlier studies have consistently validated the finding that sense of community relates to learner satisfaction in distance education. Building a sense of community in distance courses can also reduce attrition (Trespalacios & Lowenthal, 2019). Other study findings also revealed that sense of community relates to perceptions of learning (Trespalacios & Lowenthal, 2019). This means that distance learners feel that a robust sense of community enhances learning outcomes. (Trespalacios & Lowenthal, 2019). A lower sense of community, however, is one of the major contributors to online learners'

lack of satisfaction in a distance setting (Oregon et al., 2018). Oregon et al. (2018) explained that being separated physically can lessen the sense of community and add to perceptions of being disconnected and isolated.

Many studies have indicated that social presence is an important aspect of distance learning. However, it is important to consider that sense of community may not always be perceived that way by learners or instructors in online courses. Trespalacios and Lowenthal (2019) related that sense of community is, at times, regarded as being something that every student wants or requires in distance courses. However, Trespalacios and Lowenthal proposed that a sense of community, for some online learners, as well as instructors, is not as relevant. Trespalacios and Lowenthal explained that findings from previous studies have indicated that learners' personality traits or their style of learning may influence how they regard interaction in distance courses. Trespalacios and Lowenthal also suggested that some learners or instructors may have difficulties participating in activities that develop community. Trespalacios and Lowenthal cited Su et al.'s 2005 study of learners in an online graduate program. The results of Su et al.'s 2005 study indicated that instructors felt that interactions between learners and instructors are an essential part of high-quality distance programs. In addition, Su et al. (2005) stated that distance students felt that interaction was useful for learning, but they differed on the amount of interaction needed in distance courses. Su et al. stated that learners' differing perceptions appeared to relate to how their personalities or styles of learning varied.

Persistence and Instructor Presence

Glazier (2016) posited that the design of online courses is not conducive to developing rapport between instructors and learners. In some instances, learners feel disconnected and drop the course, which lowers its retention rate. Glazier proposed that enhancing rapport between instructors and learners is one way of improving retention in distance learning. During a six-year period, Glazier utilized a variety of instructional strategies to build rapport in some of her online classes. She established instructor presence by sending emails throughout the term, making videos with updates of weekly course content, giving electronic feedback on assignments, and posting on the discussion boards each week (Glazier, 2016). Glazier's findings showed that courses taught with strategies to build rapport experienced far less attrition and greatly improved grades (Glazier, 2016). Shin (2003) stated that persistence in online courses is also predicted by learners' perceptions of transactional presence. Transactional presence relates to online learners' perceptions of the accessibility of, and connectedness with, individuals in their online environment. Shin explained that instructors, peers, and the support staff at academic institutions are important individuals for online learners. Transactional presence was also the focus of Naylor and Wilson's 2009 study. The authors investigated how graduate learners perceived transactional presence with instructors and other learners. Naylor and Wilson (2009) stated that distance courses are characterized by less dialogue and more structure. The authors suggested that the effects of transactional distance can be lessened if instructors interact often and regularly, and courses are developed to be less structured. Naylor and Wilson's findings confirmed that

transactional presence entails more than interacting often. Learners' satisfaction with the quality of the interactions is an important consideration.

Engagement in Distance Education

Benefits of Engagement

Learners mainly interact with the content of their course, other learners in the course, and the instructor of the course (Bolliger & Halupa, 2017). Engagement is beneficial to learners in distance courses. A learner's level of engagement corresponds positively to his or her outcomes (Bolliger & Halupa, 2018). Bolliger and Halupa's 2018 study investigated how distance learners perceived transactional distance, engagement, and learning outcomes. Their analyses demonstrated an inverse relationship between transactional distance and learners' engagement. When learners perceived a lower level of transactional distance, their level of engagement increased (Bolliger & Halupa, 2018). Martin and Bolliger (2018) discussed ways of engaging learners in distance courses. Participating in engagement-related strategies such as collaborating in groups, facilitating discussions, and facilitating presentations are activities that involve active learning (Martin & Bolliger, 2018). Martin and Bolliger examined how learners perceived varying engagement methods utilized in their online classes. Moore's (1993) model for interaction in distance education provided the framework for Martin and Bolliger's study. Their findings indicated that incorporating interactive aspects in online courses enriches engagement. Martin and Bolliger also emphasized that instructors, as facilitators, require strategies for managing time and improving interaction in distance courses.

Perry and Steck (2019) surveyed two groups of instructors who taught online courses. One group was from 2002 and the second group was from 2016. They compared how each group perceived distance instruction. Findings from Perry and Steck reinforced the idea that providing good instruction, and fostering learners' engagement as well as active learning, should continue to be a prime concern. Online courses are delivered by advanced technology, but faculty are responsible for instructional standards and course management (Perry & Steck, 2019). Perry and Steck noted that their study should be repeated, but participants should include faculty as well as students.

Engagement and Interaction

In earlier online courses, content was mainly presented in a text format (Daily-Hebert, 2018). However, the design of online courses has been informed by research and technological advancements which make it possible for learners to connect in myriad ways. Online learning can approximate the learning experience provided in face-to-face settings (Dailey-Hebert, 2018). Daily-Herbert (2018) stated that interaction in online courses may be synchronous; it takes place in actual real time. Learners can have real-time chats or participate in video conferences or webinars. Synchronous interactions also allow learners to collaborate, receive instructor feedback without delays, talk to instructors during their office hours, and participate in realities that are virtual or augmented. Realities that are virtual or augmented are created by computer; they allow learners to engage in settings analogous to those that are physical and three-dimensional (Daily-Hebert, 2018). Conversely, communication which occurs asynchronously does not

take place in real time. E-mail, pre-recorded lectures, and discussion boards are used to interact asynchronously.

Moore (1989) advanced a model of interaction for online learning. The three types of interactions he proposed were learner to learner, learner to instructor, and learner to content. Subsequent models from other researchers included other forms of interaction such as instructor to content, instructor to instructor, as well as content to content (Kuo et al., 2013). However, Daily-Hebert (2018) stated that communication, or interactivity, in online settings, usually takes place in three modes. It can take place between learners, between learners and the instructor, or between learners and content (Daily-Hebert, 2018). Interactivity is an integral aspect of online learning. Previous research findings have indicated that interactivity, especially interactivity between learner and instructor, can contribute greatly to learner satisfaction (Dailey-Hebert, 2018). Insufficient interaction, however, is problematic.

Cole et al. (2014) conducted a study of undergraduate and graduate learners at a university that took place over three years. They surveyed participants with a five-point Likert scale to measure their satisfaction with distance learning and asked open-ended questions about factors that influenced their satisfaction or lack of satisfaction with their online courses. Cole et al. found that insufficient interaction with other learners and the instructor was a primary cause of dissatisfaction. Kuo et al. (2013) investigated whether certain variables such as interaction and self-regulation predict learner satisfaction in online environments. The students who participated were enrolled in undergraduate and graduate-level courses. Kuo et al.'s analyses focused on interaction between learners,

interaction between learners and the instructor, and interaction between learners and content. Their findings suggested that learner to instructor interaction and learner to content interaction strongly predicted learner satisfaction. Kuo et al. stated that researchers have viewed interaction as one of the primary facets of remote education because of the isolation that learners and instructors experience. In addition, Kuo et al. related that findings from previous studies have suggested that interaction has a positive effect on learners' satisfaction with distance learning.

Rogerson-Revell (2015) conducted a study of an online master's degree program for teachers. The participants completed modules which involved asynchronous activities. Varying technologies were utilized to bring about collaborative learning as well as formative evaluations. Learners interacted via discussion boards that included voice recordings (audio) as well as text-based posts, blogs, and podcasts. Rogerson-Revell cited findings from a study by Kirkwood et al. (2008) which indicated that it is more effective to integrate technology as courses are being designed. The findings of Rogerson-Revell's study indicated that discussions which utilized voice recordings could lead to more collaborative learning and promote learners' engagement with course material.

Jackson (2019) reviewed literature pertaining to how instructors can enrich perceptions of connectivity and interaction in distance learning. The literature review included Garrison et al.'s (1999) Community of Inquiry (COI) model. In this model, learning results from interactions occurring between teaching, social, and cognitive presence (Jackson, 2019). Orcutt and Dringus (2017) explained that Garrison et al.'s

(1999) Community of Inquiry (CoI) model presented a framework which advanced that teaching presence affects social as well as cognitive processes in online settings. Previous studies relating to teaching presence have enhanced understanding of the collaborative aspects of the online setting and have offered insight into ways that learners and instructors share responsibility for the acquisition of knowledge and skills (Orcutt & Dringus, 2017).

Jackson (2019) related that the research findings suggested that instructor-learner interactions, especially those relating to learners' questions, have not received as much attention. Instructors can enhance social presence by replying to learners' questions about course content, assignments, or other concerns. (Jackson, 2019). Jackson cited research by Orcutt and Dringus (2017) which indicated that instructors in distance education can use discussions and instructors' replies to learners' questions to influence learning and engagement as well as intellectual curiosity. The Community of Inquiry model describes teaching presence as a concept that lessens the transactional distance occurring between learners and instructors by interaction (Orcutt & Dringus, 2017).

Greater insistence on attainment of retention and learning outcomes has persisted in postsecondary education. Consequently, instructors have directed more focus toward ameliorating approaches to teaching that can result in learner outcomes in an online setting (Orcutt & Dringus, 2017). Evolving technology in online settings has facilitated learner-instructor interactions which involve collaborative learning (Orcutt & Dringus, 2017). However, advancements in distance education have not always been easy for instructors to follow. Some instructors may be over-reliant on technology to connect with

learners or return to strategies more appropriate for actual classrooms (Orcutt & Dringus, 2017). Orcutt and Dringus' (2017) qualitative study examined how educators viewed teaching presence in online courses and the reasoning underlying the teaching strategies they chose to create it. Their findings indicated that the educators created teaching presence by interacting with learners in ways that influenced their engagement as well as their intellectual curiosity.

Research on Interaction in Distance Education

Interaction in Distance Education

According to Xiao (2017), interaction is a recurring concept in literature pertaining to distance learning. Xiao pointed out that that many studies have focused on shared or interchangeable interaction: learner to learner or learner to instructor. However, fewer studies have examined the interaction between learner and content. Xiao posited that this type of interaction is integral to assuring the efficacity of distance learning. During the earlier times of distance learning, learners were separated physically from other learners, their instructor, and institution. The interaction usually occurred between the learner and the educational materials and was not reciprocal, which was viewed as a limitation of distance learning. Xiao cited earlier researchers who supported the importance of interaction between learner and content that occurs in distance learning. Interaction is an essential feature for such settings. An insufficient level of interaction, or a lack of interaction, can lead to feelings of isolation and reduce the quality of learning being experienced. Rhode (2009) stated that higher education distance learning programs

seek to promote varying interactions where learners feel engaged and interact meaningfully with other learners, their instructor, and the content in the course.

Another type of interaction in distance learning, learner to instructor, is analogous to learner to content interaction. This type of interaction is incorporated into educational materials to lessen the difference between face-to-face, on-campus learning and distance learning. The interaction occurring between learner and content underlies the other types of interactions (Xiao, 2017). Xiao (2017) stated that understanding the strategies learners utilize when studying online, printed, audio, interactive, graphic, or video course materials can help to attain learning objectives.

Learners' Interaction Preferences

Xiao (2017) explained that learners might prefer some types of interaction more than other types. Rhode (2009) conducted a mixed-methods study to ascertain what mode of interaction was considered most valuable by learners in an online setting that was self-paced. The learners interacted with rich text and used asynchronous tools to communicate such as discussions boards and blogs. Rhode stated that the learners had a higher degree of interaction with the course content or the instructor on levels that were formal as well as informal. Padilla Rodriguez and Armellini (2013) had similar findings from their study. Padilla Rodriguez and Armellini conducted a study at a large organization that offered a virtual university. Padilla Rodriguez and Armellini wanted to assess how learners perceived three modes of interactions, learner to instructor, learner to content, and learner to learner and their viewpoints on the effectiveness of the online courses for training. Padilla Rodriguez and Armellini's findings indicated that learner to content

interactions were regarded as the most valuable compared to learner to learner and learner to instructor interactions.

Community in Distance Education

Community and Interaction

As of 2016, more than three million learners were taking online courses to complete their degree; in 2020, that number is estimated to rise to five million learners (Clinefelter & Aslanian, 2016). Growth in enrollment has changed distance education. Interactivity is increasingly required between other learners and instructors; thus, approaches to enhance interactivity and perceptions of community in distance programs have been sought **(**Clinefelter & Aslanian, 2016). Banna et al. (2015) examined how interaction could be promoted in an online course. Banna et al. stated that learner engagement is built via interaction. When learners work together, they actively construct knowledge. The instructor, by interacting with learners, builds social presence, a requisite aspect of effective distance courses (Banna et al., 2015). Synchronous monthly discussions with learners and the instructor, polls, and social media were utilized in the course. The learners who participated in the synchronous discussions returned qualitative feedback about the new interactive facets of the course. Banna et al. found that the learners deemed the synchronous interactions beneficial.

Trespalacios and Uribe-Florez (2020) examined how learners in an online doctoral course perceived sense of community and learning in their course. The participants interacted and collaborated within their course by posting an introductory video, recording posts to other learners, having asynchronous group discussions, and used

video to interact synchronously with the instructor. Trespalacios and Uribe-Florez used two surveys to collect quantitative data. They conducted interviews that were semi-structured and synchronous to collect qualitative data. The findings of their study suggested that using a variety of activities to interact while providing scaffolding can support learning and promote sense of community for online graduate learners.

An earlier study by Beson (2019) examined sense of community in graduate online programs. Beson explained that sense of community is a concept that has been widely examined in distance education. Some facets of sense of community include consistently interacting with members of the group and perceiving connectedness. A vigorous sense of community corresponds positively to learners feeling engaged and satisfied, as well as perceptions of belongingness (Beson, 2019). Beson stated that the results of his study correspond to earlier research on sense of community. Beson found that learners who interact at higher levels with other learners and instructors are inclined to report greater levels of sense of community. However, Beson pointed out that some of his findings do not correspond to previous studies. For example, findings from prior studies have indicated that females are inclined to report greater levels of sense of community compared to males (Beson, 2019).

Community and Online Technologies

In their 2019 study, Swartzwelder et al. investigated whether discussions that were video based would enhance learners' level of interactivity and engagement in an online graduate nursing program. Swartzwelder et al. (2019) pointed out that instructors need to ascertain which strategies enhance how learners engage with online course

content and interact with other learners. They also discussed how social learning could be useful when incorporating new technologies in distance classes. Feedback from surveys revealed that learners preferred the discussions that were text-based (Swartzwelder et al., 2019). For example, some learners were not comfortable making videos, or the feedback for the text-based discussions was more positive and promoted more learner interaction and engagement.

McClannon et al. (2018) explored factors that were used to predict how learners perceived community and presence in the virtual immersive setting. Cheney and Terry (2018) explained that an immersive setting is one that uses technology that allows "sensory immersion" (p. 281). McClannon et al. surveyed graduate learners who were using immersive distance learning settings for the work in their course. Factors relating to the course structure and learner engagement were used in the study. Learners used integrated audio and shared web documents, video, and images on display panels to interact and collaborate synchronously (McClannon et al., 2018). McClannon et al. explained that sense of community in distance communities varies greatly from those that are face-to-face. Their findings indicated that the learners' sense of community was increased by factors relating to how the course was structured, how much time learners spent in the immersive setting weekly, and how long they were in the program (McClannon et al., 2018). The findings also indicated that the learners' sense of presence increased (McClannon et al., 2018).

McClannon et al. (2018) emphasized the importance of understanding facets of online settings that bring about favorable outcomes. In addition, McClannon et al.

suggested that additional studies are needed to ensure the consistency of their findings. Gardner and Elliott (2014) related how an immersive setting was used to give learners a virtual classroom in a mixed reality setting. The instructor was in an actual class giving a lecture. Technology such as display screens in the classroom, audio, and live video streaming, allowed local and distant learners to interact with each other as well as the instructor. Gardner and Elliott stated that these interactions promoted learners' sense of community and provided practice for teaching.

Attrition, Isolation, and Disconnectedness in Distance Education

Attrition and Lack of Interaction

Persistence and degree completion are highly significant to learners and to academic institutions' viability. Degree completion evinces that an academic institution is realizing its mission to instruct and graduate students (Shaw et al., 2016). Shaw et al. (2016) examined factors that predict attrition in distance education. Shaw et al. suggested that subsequent studies compare findings from distance learning and face-to-face groups to see if comparable factors increase the chances of learners withdrawing from programs or withdrawing prior to finishing their first class. A lack of interactivity may contribute to attrition in online settings (Croxton, 2014). Findings from previous studies indicate that lower levels of interactivity may result in online learners becoming less satisfied, feeling more isolated, and being more likely to leave the online setting (Croxton, 2014).

Graduate programs have continued to experience high levels of attrition (Des Armier & Bolliger, 2019). When learners lack a feeling of connectedness, it could lead to feelings of isolation. Such feelings can have a deleterious effect on learners' program

completion (Des Armier & Bolliger, 2019). Phirangee (2016) conducted a qualitative study of learners in an online graduate program to explore the types of interactions that could diminish sense of community and bring about attrition. For her study, Phirangee defined community as involving a perception of belonging as well as interactivity for learners in an online class. Phirangee cited findings from previous studies which suggested that feeling isolated and disconnected resulted in learner attrition. Phirangee cited numerous scholars who contended that interaction is intrinsic to establishing community throughout an online class. Learners are inclined to interact to a greater extent, which could reduce perceptions of being isolated and disconnected (Phirangee, 2016).

Phirangee (2016) found that certain types of learner-to-learner interactions could lead to attrition. For example, learners failing to give other learners credit for ideas introduced in discussions or learners discussing points unrelated to the main topic. Phirangee suggested that understanding the type of interactions that result in learners feeling isolated could help instructors change their teaching strategies to sustain a vigorous sense of community among learners.

Isolation and Disconnectedness in Online Courses

Isolation is a feature of online courses in that physical isolation occurs, and perceptions of isolation can result in learner attrition (Glazier, 2016). Reupert et al., (2009) observed that isolation can also result in an online learner not feeling engaged with his or her instructor, other learners, or the academic institution. Online learners' rate of dropping out is higher than those in face-to-face settings. Delahunty et al. (2014) noted

that perceptions of being disconnected is a concern for learners in distance education. Interactions between learners are beneficial and bring about engagement. To avert possible isolation, it is very important to develop course activities that promote learners' engagement (Martin & Bolliger, 2018).

Diminishing Perceptions of Isolation

Isolation can affect learners in distance courses. However, its effects can be minimized through constructive interactions with the course instructor. Such interactions can influence learners' success in distance courses (Glazier, 2016). Martin et al. (2018) stated that findings of prior studies have shown that learners' engagement results in higher satisfaction. This can improve learners' drive to learn and lessens perceptions of isolation. Martin et al. investigated how online learners perceived varying facilitation modes that instructors used to build presence, learning, and engagement. When instructors interact with learners and promote their active participation, they also function as facilitators in the online course (Martin et al., 2018). Martin et al. noted that instructor presence is key to effective asynchronous courses. Researchers have found that instructor presence corresponds to learners' achievement or satisfaction in distance education. In addition, instructor presence minimizes learners' perceptions of isolation, which can improve retention in the course (Martin et al., 2018).

This literature review consists of literature search strategies and the theoretical framework for the study. Issues that appertain to distance learning such as connectivity, persistence, retention, engagement, community, attrition, and isolation in distance education are also discussed. In the following chapter, Research Method, I identify the

research design, research problem, research questions, population and sample for the study, sampling method, criteria for participant inclusion or exclusion, instrument for collecting data, software to analyze the data, and the statistical methods used to analyze the data.

Chapter 3: Research Method

Introduction

This chapter presents the purpose of the study, the research design and its rationale, the means of data collection, variables that were measured, the instrumentation, data analysis, and research questions and hypotheses. I also describe the population that was sampled, how participants were recruited, and the power analysis used to determine the sample size. Other areas include ethical considerations, such as Institutional Review Board (IRB) approval, participant protection, how data will be protected, and study limitations.

Study Purpose

Persistence has become problematic in distance learning. The purpose of this quantitative nonexperimental study was to examine whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. The predictor variables that were measured in the study were perceived connectivity, perceived internal locus of control, and age. The criterion variable that was measured was persistence. The predictor variables, as well as the criterion variable, were measured as continuous variables (Segrin, 2012).

Research Design and Rationale

This study was quantitative with a nonexperimental design; I used a survey as a means of data collection. In a nonexperimental design, the relationships between already-existing groups are examined and random assignment of participants is not part of the design (Lobmeier, 2012). In addition, a nonexperimental design does not involve

manipulation of the independent variable. It is not concluded that a relationship that is causal exists between the variables that are being measured (Lobmeier, 2012).

The independent variables that were measured were perceived connectivity, perceived internal locus of control, and age. Persistence was the dependent variable measured in the study. The aim of research questions in quantitative studies is to determine if there is a relationship among the variables (Creswell, 2014). Creswell explained that independent variables may produce outcomes or influence outcomes.

Multiple linear regression was used to examine how strongly the continuous predictor variables, perceived connectivity, perceived internal locus of control, and age, predict the value of the continuous criterion variable, persistence. When multiple linear regression is used to analyze data, the independent variables are also referred to as predictor variables (Segrin, 2012). Dependent variables, according to Creswell (2014), are influenced by independent variables. The dependent variable in multiple linear regression is also known as the criterion variable (Segrin, 2012).

Instrumentation

A survey comprised of three instruments was used to collect data: Bollinger and Inan's (2012) Online Student Connectedness Survey (OSCS), Duttweiler's (1984) Internal Control Index, and Duckworth et al.'s (2007) Grit Scale. Bollinger and Inan's OSCS were used to measure learners' perceptions of connectedness within their online master's degree programs. Bolliger and Inan explained that the OSCS is comprised of 25 items using a 5-point Likert scale. The five responses to statements range from 1(strongly

disagree) to 5 (strongly agree). The OSCS includes four subscales (community, comfort, facilitation, and interaction and collaboration).

Bolliger and Inan (2012) conducted a study using the OSCS in programs offered at two universities. One university was in the western part of the United States and the other university was in Turkey. In the United States, three programs were delivered online; in Turkey, one program was delivered online. Bolliger and Inan stated that the findings from the study in the United States indicated that the coefficient for internal reliability was (α=0.98). The findings from the study in Turkey also indicated that the internal reliability was (α=0.97), and the coefficients for internal reliability for each of the subscales in the instrument were high: Comfort was (α=0.97), community was (α = 0.96), facilitation was (α = 0.94), and interaction and collaboration were (α = 0.97). Various experts at three universities located in the United States evaluated the survey items to affirm the survey's construct validity (Bolliger & Inan, 2012). According to Bolliger and Inan, the survey items were analyzed to see if they represented the construct being measured and whether the items were expressed clearly.

In addition, Jamison and Bolliger (2020) used the OSCS in a study with two midwestern online graduate programs. Jamison and Bolliger stated that the instrument's coefficient for internal reliability was high (α = 0.94), and the reliability for each subscale was also high: comfort was (α=0.86), community was (α = 0.89), facilitation was (α = 0.81), and interaction and collaboration were (α = 0.88). With the author's permission, I modified the verb tenses in the OSCS to reflect past tense instead of the present tense that Bolliger and Inan (2012) used.

Duttweiler's (1984) Internal Control Index measures learners' internal locus of control. Duttweiler's Internal Control Index is comprised of 28 items to measure individuals' attitudes or beliefs regarding possible outcomes or reinforcements (Duttweiler, 1984). Duttweiler administered the Internal Control Index at a 2-year college in Georgia. Analyses indicated that the reliability for the internal control index was approximately .84 (Duttweiler, 1984). The participants responded to each statement by filling in a blank with a letter that corresponded to their typical attitude or feelings in average situations. The participants selected a response from five options ranging from Rarely (Less than 10% of the time) to Usually (More than 90% of the time) (Duttweiler, 1984). In addition, Duttweiler explained how to score each item and the maximum or minimum total to indicate participants' internal locus of control. To confirm the instrument's convergent validity, Duttweiler analyzed data from a field test (n = 684) and replicated the study with 133 students from a 2-year college.

Grit, a trait that is noncognitive, is described as perseverance as well as passion toward goals over an extended period of time (Duckworth et al., 2007). In online settings, drop out often occurs when learners face difficulties (Hochanadel & Finamore, 2015). The Grit Scale emphasizes maintaining effort, as well as interest, toward attaining goals over an extended period of time. The instrument consists of 12 items with two factors. One factor showed "consistency of interests" (Duckworth et al., 2007, p. 1090), and the other factor showed "perseverance of effort" (Duckworth et al., 2007, p. 1090). Duckworth et al. (2007) explained that the items are based on a 5-point scale ranging

from responses to statements such as 1(not at all like me) to responses such as 5 (very much like me).

Overall, the Grit Scale was internally consistent at a high level (α = .85). Both factors were also internally consistent at a high level (α = .84; α = .78). Duckworth et al. (2007) used the Grit Scale in several studies. One study included a sample of more than 1,500 participants (*N*= 1,545) and a subsequent study included more than 600 participants (*N*= 690). The participants' average age was 45 (*M* = 45). The findings from both samples indicated that Grit was related to the level of attained education. Duckworth et al. also used the Grit Scale in a study at West Point to predict retention for two classes of cadets (*N*= 1, 218; *N*= 1, 308) in a summer program; the coefficient for internal reliability was (α = .79).

Methodology

Data Analysis

I used multiple linear regression to analyze the relationship between the predictor variables, perceived connectivity, perceived internal locus of control, and age and the criterion variable, persistence. Multiple linear regression is used to analyze the relationship between independent variables (two variables or more) and one dependent variable (Segrin, 2012). This analysis can be used to predict a certain variable's values according to what is known about its relationship with the other variables' specified values. Multiple linear regression is also used for hypothesis testing relating to what degree particular variables explain change in a dependent variable (Segrin, 2012). In

addition, this method of analysis can be employed to test relationships among variables that are continuous or categorical (Segrin, 2012).

I collected demographic information from four questions. The participants selected their highest level of completed education (bachelor's degree or master's degree), indicated whether online courses were their preferred instructional format, stated their age, and indicated their gender (male or female). Gender was not included in the multiple linear regression analysis. I performed an Independent Samples *t*-Test to see if the means varied for the continuous predictor variables, connectivity, internal locus of control, and age, between the two completed education levels.

I used SPSS (Version 28) to perform the multiple linear regression analyses and an Independent Samples *t*-Test. Multiple linear regression analyses were used to address research questions one to three. An Independent Samples *t*-Test was utilized to address research question four. I used the results from the data to create histograms, tables, and scatter plots.

Multiple Linear Regression Assumptions

The researcher needs to take the assumptions regarding multiple linear regression into consideration. Researchers use multiple linear regression to analyze data when meeting assumptions pertinent to the data (Segrin, 2012). First, multiple linear regression requires that the independent variables and dependent variable relate to each other linearly (Segrin, 2012). Homoscedasticity, another assumption, states that for every independent variable's potential value, the residuals' variance predicting *Y* need to be uniform (Segrin, 2012). Next, multivariate normality is an assumption that residuals have

a normal distribution (Abbott, 2016). Finally, multicollinearity should not affect the data. Warner (2013) explained that multicollinearity means that predictor variables correlate highly with each other. Consequently, it could be difficult to determine how the predictor variables contribute and the regression coefficients' standard errors could become larger (Warner, 2013).

Research Questions and Hypotheses

RQ1: To what extent will perceived connectivity predict persistence in online master's degree programs?

$H_0$1: Perceived connectivity will not predict persistence in online master's degree programs.

H_A1: Perceived connectivity will predict persistence in online master's degree programs.

RQ2: To what extent will perceived internal locus of control predict persistence in online master's degree programs?

$H_0$2: Perceived internal locus of control will not predict persistence in online master's degree programs.

H_A2: Perceived internal locus of control will predict persistence in online master's degree programs.

RQ3: To what extent will age predict persistence in online master's degree programs?

$H_0$3*:* Age will not predict persistence in online master's degree programs.

H_A3: Age will predict persistence in online master's degree programs.

RQ4: To what extent will the means vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program?

$H_0$4: The means will not vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

H_A4: The means will vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

Sampling Procedures

Study Population

The study examined persistence in online master's degree programs and used a convenience sample. The inclusion criteria specified that participants were individuals who had completed an online master's degree program within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years. A 5-year limitation for inclusion would facilitate participants' recall of their perceptions of connectedness and internal locus of control within their online master's degree program.

A convenience sample is a type of non-probability sampling. Etikan et al. (2016) stated that convenience sampling does not give each of the individuals who are part of the target population an equal chance of participation. Bigsby (2018) stated that non-probability sampling is less generalizable than probability sampling. Researchers who

conduct non-probability sampling do not know if the sample selected represents the population that is under study (Bigsby, 2018). Nonprobability sampling is used for myriad reasons. In some circumstances, there is not enough information regarding the population to perform probability sampling or the subjects needed for the sample are not easily accessible (Hussey, 2012). Hussey (2012) further explained that researchers may face difficulties pertaining to funding and resources that are needed to conduct research involving a substantial sample size.

Study Recruitment

The study was posted on Walden University's Participant Pool, and a study flyer was posted on the Facebook and LinkedIn websites. Minors were not recruited as participants for the study. To ensure that the study only included adult participants, the inclusion criteria specified that any individuals who wanted to participate in the study must be 18 years of age or older. The study flyer stated the purpose of the study and the criteria for inclusion. The study flyer also stated that participation was voluntary, participants would not provide their names, and participants would not receive any compensation.

When the individuals read the consent form, they were able to access a link to Survey Monkey. Individuals who indicated that they wanted to participate were forwarded to the survey. The individuals who indicated that they did not want to participate were exited from Survey Monkey. The data collected from the survey will be stored securely in a password-protected file for 5 years.

Power Analysis

I determined the sample size I used for the study by downloading G* Power software (Faul et al., 2009). I chose F-Tests for the test family, selected Linear Multiple Regression, R^2 Deviation from Zero for the statistical test, and selected a prori power analysis. I selected a medium effect size, which Cohen (1988) stated is $f^2 = .15$. (as cited in Faul et al. 2009). I selected the alpha level, $\alpha = .05$, the α err prob was .05, and for power (1- β err prob), I entered .80. This resulted in a total sample size of 77 participants.

According to Cohen (1992), power analysis involves four interrelated components: the criterion for significance (α), sample size (*N*), population effect size (ES), and statistical power to make statistical inference. The statistical power involved in significance testing allows researchers to reject the null hypothesis (H_0) when taking the α, *N*, and ES into consideration (Cohen, 1992). When the ES does not equal zero, failing to reject the H_0 results in a type II error. With any specified α, *N*, and ES, the chances of this type of error taking place is β, and power is 1- β, which is the chance of rejecting a H_0 that is false (Cohen, 1992). Cohen explained that in such a context, the required power is .80 and β =.20, which is a practice suggested for customary usage. In addition, a value that is considerably smaller than .80 could bring about a Type II error, while a value that is substantially larger would produce a requirement for *N* which goes beyond the researcher's resources (Cohen, 1992).

Ethical Considerations

I began the study after I received approval from Walden University's Institutional Review Board (IRB). Minors were not recruited as participants for the study. To ensure that the study only included adult participants, the inclusion criteria specified that any individuals who wanted to participate in the study must be 18 years of age or older. Individuals read the consent form and proceeded to Survey Monkey to take the survey. The data was transferred to a file in SPSS (Version 28) and will be stored securely in a password-protected file for five years.

Study Limitations

Nonprobability sampling is less generalizable than probability sampling. Representative samples generalize to a target population to a greater degree. Consequently, the findings from a study would be more pertinent to the target population (Bigsby, 2018). In addition, using nonprobability sampling can make it difficult to determine sampling error and find to what extent the sample is similar to, or differs from, the target population (Bigsby, 2018). Losh (2012) explained that sampling error indicates the extent to which the sample varies from other samples and plays an important part in describing the results of the research.

Chapter four describes the participant recruitment and data collection process. The findings derived from the descriptive statistics, multiple linear regression analysis, and Independent Samples *t*-Test are discussed in this chapter. A discussion of how the assumptions for multiple linear regression were satisfied is included as well. Histograms,

tables, and scatterplots also provide an illustration of the demographic information and various data outputs.

Chapter 4: Results

Introduction

Persistence has become problematic in distance learning. Findings from recent studies have shown that 29% of learners in the United States enrolled solely in distance learning courses (Ginder et al., 2018). However, findings from a number of studies have indicated that rates of persistence for courses delivered online continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019). The purpose of this quantitative nonexperimental study was to examine whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. The study sample ($N = 68$) consisted of individuals who have completed an online master's degree program within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years.

The following research questions and hypotheses were addressed in the study:

RQ1: To what extent will perceived connectivity predict persistence in online master's degree programs?

$H_0$1: Perceived connectivity will not predict persistence in online master's degree programs.

H_A1: Perceived connectivity will predict persistence in online master's degree programs.

RQ2: To what extent will perceived internal locus of control predict persistence in online master's degree programs?

$H_0$2: Perceived internal locus of control will not predict persistence in online master's degree programs.

H_A2: Perceived internal locus of control will predict persistence in online master's degree programs.

RQ3: To what extent will age predict persistence in online master's degree programs?

$H_0$3*:* Age will not predict persistence in online master's degree programs.

H_A3: Age will predict persistence in online master's degree programs.

RQ4: To what extent will the means vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program?

$H_0$4: The means will not vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

H_A4: The means will vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

This chapter describes the participant recruitment and data collection process. The findings derived from the descriptive statistics, multiple linear regression analysis and an Independent Samples *t*-test are discussed in this chapter. A discussion of how the assumptions for multiple linear regression were satisfied is included as well. Histograms,

tables, and scatter plots also provide an illustration of the demographic information and various data outputs.

Data Collection

After Walden University's IRB granted approval for this study, I began the data collection process. The survey became available online on June 27, 2022, and closed on February 27, 2023. I downloaded raw data from Survey Monkey to SPSS (Version 28) for analysis. The files from SPSS were saved on a file that is password protected.

I recruited study participants recruited via Walden University's Participant Pool, Facebook, and LinkedIn. Survey flyers were posted on Facebook and LinkedIn, and information pertaining to the study was posted on Walden University's Participant Pool. The study's purpose, its benefits, participation requirements, and time needed to participate were included on the flyer. It was also stated that participants would not receive any compensation. Individuals who wanted to participate clicked on a link to the study's consent form. If they chose to participate, they were directed to Survey Monkey to complete the survey. In total, 86 surveys were submitted. However, only 68 surveys were completed, which resulted in a response rate of 79%. Moreover, the power analysis determined that the study required a sample size of 77 participants. The sample size (N= 68) was 88% of the sample size needed for the study.

Before the data were analyzed, I performed data cleaning. I removed information such as the collector number, the respondents' identification number, and the collector identification number from the dataset. I did not collect the IP addresses or the

participants' email addresses. I also removed 18 of the surveys from the data set because they were missing data.

A survey comprised of three instruments was used to collect data: The OSCS (Bollinger & Inan, 2012), The Internal Control Index (Duttweiler, 1984), and The Grit Scale (Duckworth et al., 2007). Demographic information at the beginning of the survey provided data for the participants' ages, highest completed level of education, gender, and whether online courses were their preferred instructional format. I inputted raw data from the dataset into SPSS and used multiple linear regression to examine how the continuous predictor variables, perceived connectivity and perceived internal locus of control, and age explained the value of the continuous criterion variable, persistence.

` The 25 items for the OSCS were under four subscales: community, comfort, facilitation, and interaction and collaboration. The scores for the responses ranged from one to five. The community subscale included eight questions for a minimum value of eight and a maximum value of 40. The comfort subscale and the facilitation subscale both included six questions for a minimum value of six and a maximum value of 30. The subscale interaction and collaboration included five questions for a minimum value of five and maximum value of 25. The scores were summed in SPSS for the four subscales to obtain the values for the predictor variable, connectivity.

The Internal Control Index is comprised of 28 items. The scores for the Internal Control Index ranged from one to five. The values for these scores ranged from a minimum value of 28 to a maximum value of 140. The scores were summed in SPSS to obtain the values for the predictor variable, internal locus of control.

The participants provided demographic information pertaining to their ages. The ages were not organized into age ranges. Individual age values were entered into SPSS to obtain the values for the predictor variable, age.

The Grit Scale is comprised of 12 items. The scores for the Grit Scale ranged from one to five. The values for these scores ranged from a minimum value of 12 to a maximum value of 60. The scores were summed in SPSS to obtain the value for the criterion variable, persistence.

The sample used for the study was not representative of the population under study. I used a convenience sample for the study, which is a type of non-probability sampling. The sample of participants ($N = 68$) was 88% of the sample size of 77 that was determined by power analysis. Moreover, the data distribution for the participants was skewed toward one completed education level (master's degree) and one gender (females; See Appendix, Table A2, Table A3). Consequently, the study is not externally valid. If a study's findings are externally valid, the findings may generalize to be pertinent to everyday situations (Warner, 2013).

Convenience sampling does not give each of the individuals who are part of the target population an equal chance of participating (Etikan et al.,2016). A probability sampling has a greater chance of being representative (Fritz & Morgan, 2012). For a nonprobability sampling, the extent to which the sample is representative may be difficult to ascertain. In addition, a low response rate may result in a sample that is unrepresentative (Fritz & Morgan, 2012).

Multiple Linear Regression Assumptions Testing

It was necessary to ascertain that the assumptions for multiple linear regression analysis were satisfied. I created scatterplots and histograms and performed calculations to assess the assumptions. First, I verified that the independent and dependent variables relate to each other linearly (Segrin, 2012). I created three scatterplots to assess the linear relationship between each of the three predictor variables, connectivity, internal locus of control, and age, and the criterion variable, persistence. Figures 1, 2, and 3 display three scatterplots with a best fit line that expresses the linear relationship between these variables:

Figure 1

Scatter Plot of Persistence by Connectivity

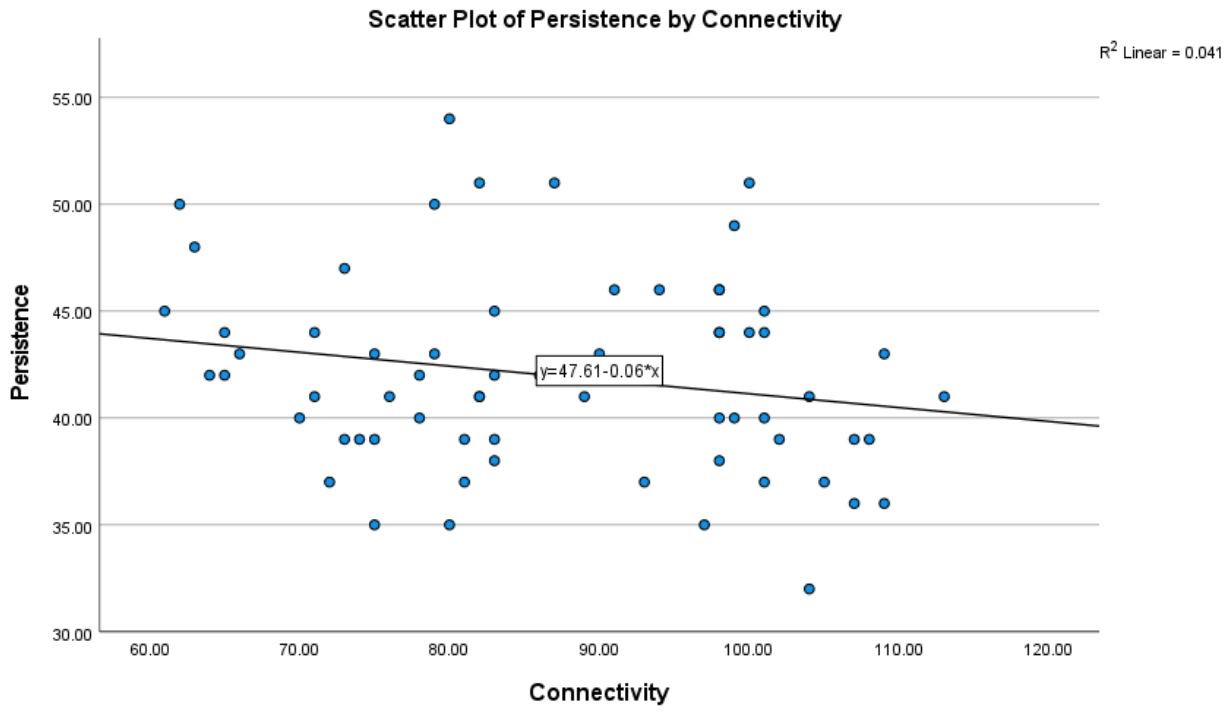


Figure 2

Scatter Plot of Persistence by ILOC

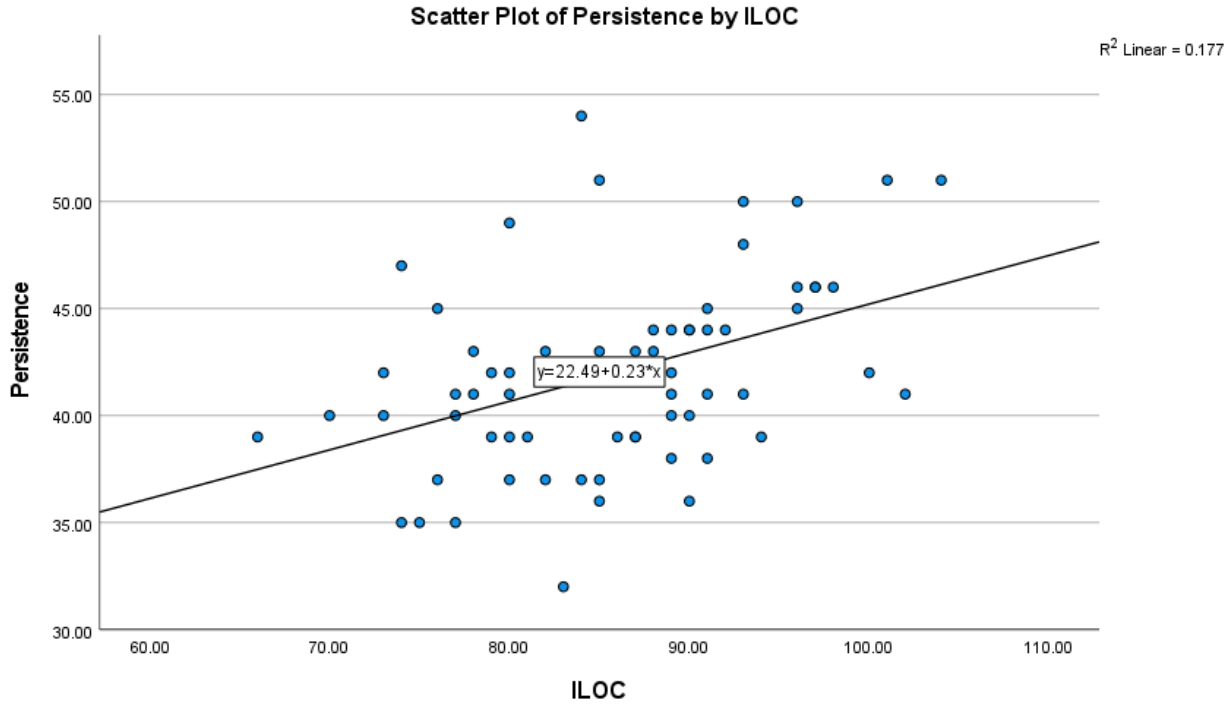
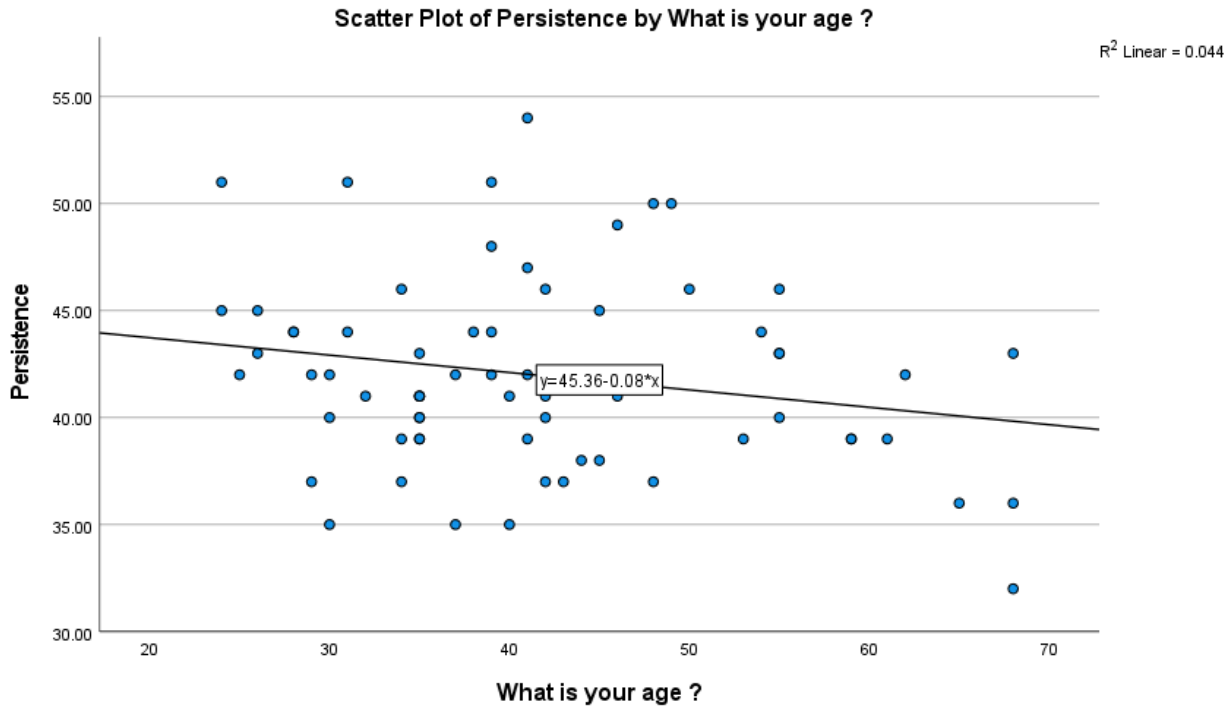


Figure 3

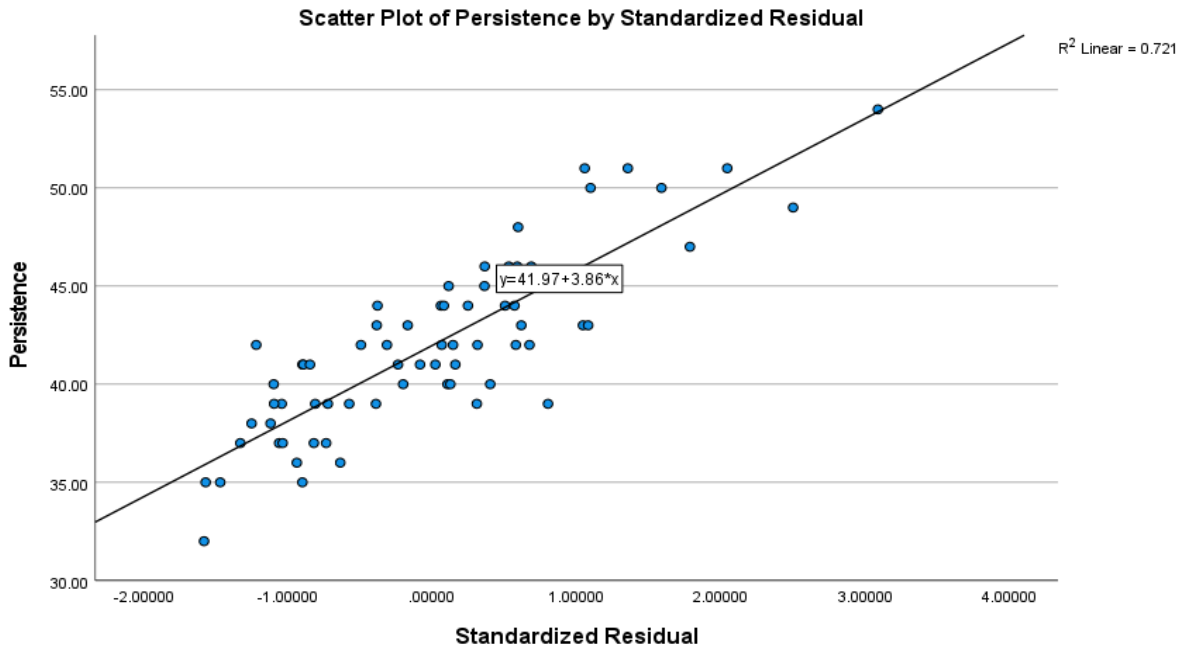
Scatter Plot of Persistence by What is your age?



Next, I verified the homoscedasticity assumption. The homoscedasticity assumption means that for every independent variable's potential value, the residuals' variance predicting *Y* need to be uniform (Segrin, 2012). To assess homoscedasticity, a scatterplot was created that displays the standardized residual against the criterion variable, persistence (Statistics Solutions, 2023). Figure 4 shows that the residuals are close to the best fit line:

Figure 4

Scatter Plot of Persistence by Standardized Residual



I subsequently assessed the assumption of multicollinearity. Multicollinearity means that predictor variables correlate highly with each other (Warner, 2013). To determine the presence of multicollinearity, I utilized SPSS to calculate the Variance Inflation Factor (VIF) for each of the predictor variables. In general, a VIF value that is higher than 10 can be indicative of multicollinearity in the data (Abbott, 2016). The VIF values for the predictor variables presented in Table 1 indicate that multicollinearity was not present in the data.

Table 1

Coefficients

Coefficients[a]

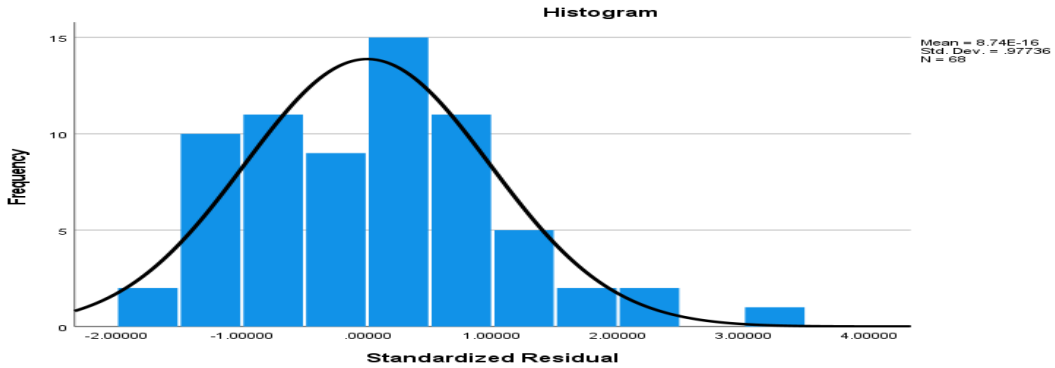
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	30.074	5.572		5.397	<.001	18.943	41.206		
	ILOC	.248	.058	.459	4.290	<.001	.133	.364	.983	1.017
	Connectivity	-.072	.035	-.225	-2.074	.042	-.141	-.003	.953	1.049
	What is your age ?	-.075	.042	-.194	-1.793	.078	-.159	.009	.966	1.035

a. Dependent Variable: Persistence

Finally, I assessed for multivariate normality, which is an assumption that the residuals have a normal distribution (Abbott, 2016). I tested for this assumption by creating a histogram that showed the standardized residual against frequency. Figure 5 displays a bell-shaped curve, which indicates that the residuals have a normal distribution.

Figure 5

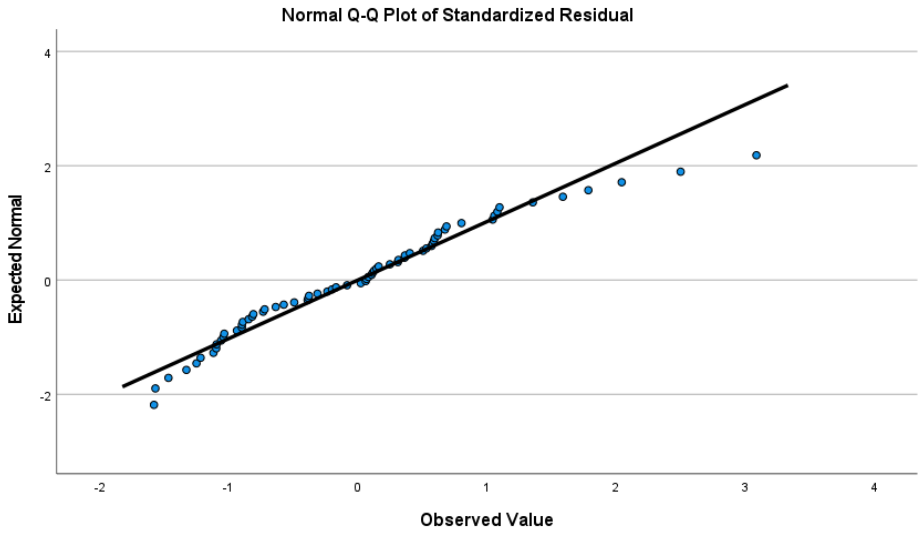
Histogram of Frequency by Standardized Residual



I also tested for multivariate normality by creating a normal Q-Q plot with a best fit line. The best fit line in Figure 6 shows that the data points are located close to the best fit line.

Figure 6

Normal Q-Q Plot of Standardized Residual



Results

Descriptive Statistics

The participants for this study were individuals who have completed an online master's degree program within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years. Participants were a minimum of 18 years old. The participants provided demographic information pertaining to their age, highest completed level of education, gender, and whether they preferred online courses as an instructional format. The participants' ages (M = 41.66, SD = 11.43) ranged from 24 years old to 68 years old. The highest percentage of the

participants were 35 years old (n = 8, 11.8%) (See Appendix A, Table A1; Figure A2). Of the total sample (N = 68), a greater percentage of the participants had completed a master's degree (n = 55, 80.9%), whereas (n = 13, 19.1%) had completed a bachelor's degree. Similarly, a greater percentage of the participants were females, (n = 55, 80.9%) while (n = 13, 19.1%) were males (See Appendix A, Table A3). Finally, the majority of participants (n = 61, 89.7 %) indicated that they preferred online courses as an instructional format compared to (n = 7, 10.3 %) who did not (See Appendix A, Table A4).

I used multiple linear regression to examine how the continuous predictor variables, perceived connectivity, perceived internal locus of control, and age explained the value of the continuous criterion variable, persistence. I used two instruments, the OSCS and the Internal Control Index, which uses a 5-point Likert scale and a 5-point scale, respectively, to address research question one and research question two. The demographic information provided data for participants' ages. A third instrument, the Grit Scale, also uses a 5-point scale, and provided the data for the criterion variable, persistence. Research questions one, two, and three are as follows:

RQ1: To what extent will perceived connectivity predict persistence in online master's degree programs?

H_0^1: Perceived connectivity will not predict persistence in online master's degree programs.

H_A^1: Perceived connectivity will predict persistence in online master's degree programs.

RQ2: To what extent will perceived internal locus of control predict persistence in online master's degree programs?

H_0^2: Perceived internal locus of control will not predict persistence in online master's degree programs.

H_A^2: Perceived internal locus of control will predict persistence in online master's degree programs.

RQ3: To what extent will age predict persistence in online master's degree programs?

H_0^3: Age will not predict persistence in online master's degree programs.

H_A^3: Age will predict persistence in online master's degree programs.

Table 2 presents findings which indicates that the predictor variable connectivity, (p = .049) had a statistically significant relationship with the criterion variable persistence. I rejected the null hypothesis for Research Question 1. The predictor variable internal locus of control (p< .001) had a very statistically significant relationship with the criterion variable persistence. I rejected the null hypothesis for Research Question 2. The predictor variable age also had a statistically significant relationship (p = .043) with the criterion variable persistence. I rejected the null hypothesis for Research Question 3.

Table 2

Correlations

Correlations

		Persistence	ILOC	Connectivity	What is your age ?
Pearson Correlation	Persistence	1.000	.420	-.203	-.209
	ILOC	.420	1.000	.126	.055
	Connectivity	-.203	.126	1.000	.182
	What is your age ?	-.209	.055	.182	1.000
Sig. (1-tailed)	Persistence	.	<.001	.049	.043
	ILOC	.000	.	.153	.327
	Connectivity	.049	.153	.	.069
	What is your age ?	.043	.327	.069	.
N	Persistence	68	68	68	68
	ILOC	68	68	68	68
	Connectivity	68	68	68	68
	What is your age ?	68	68	68	68

In addition, there was a weak, negative correlation between the predictor variable age (-.209) and the criterion variable persistence. Similarly, there was a weak, negative correlation between the predictor variable connectivity (-.203) and the criterion variable persistence. Conversely, there was a moderate, positive correlation between the predictor variable internal locus of control (.420) and the criterion variable persistence. This suggests that individuals with an internal locus of control may be more likely to persist in their online master's degree program. Age and connectivity, however, may not play as much of a part toward learners persisting toward an advanced degree in an online program.

Table 3 displays the R square value which presents the finding that 27.9% of the variability in the criterion variable, persistence, was explained by the combination of the predictor variables connectivity, internal locus of control, and age. I interpreted the effect size for the regression model by examining the value for the adjusted R square. This value specifies the effect size. It showed that 24.5% of the variability of the criterion variable, persistence, was explained by the combination of the three predictor variables, age, connectivity, and internal locus of control. Furthermore, the value of the effect size also indicates that 75.5% of the variability of the criterion variable, persistence, was contributed by other factors.

Table 3

Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.528[a]	.279	.245	3.85575	2.094

a. Predictors: (Constant), What is your age ?, ILOC, Connectivity

b. Dependent Variable: Persistence

Table 4 presents the findings of a one-way ANOVA for the regression model. The ANOVA analysis indicates that the regression model was significant $F(3, 64) = 8.261$, $p. <.001$.

Table 4

ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	368.464	3	122.821	8.261	<.001[b]
	Residual	951.477	64	14.867		
	Total	1319.941	67			

a. Dependent Variable: Persistence

b. Predictors: (Constant), What is your age ?, ILOC, Connectivity

The study participants' demographic information specified that the highest level of education they had completed was either a bachelor's degree or a master's degree. I performed an Independent Samples *t*-Test to see if the means varied for the continuous predictor variables (connectivity, internal locus of control, and age) between the two completed education levels. These data were used to address Research Question 4, which is as follows:

RQ4: To what extent will the means vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program?

H_0^4: The means will not vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

H_A^4: The means will vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program.

I conducted an Independent Samples *t*-Test to determine whether the means varied for the three predictor variables (age, connectivity, and internal locus of control) between the two completed education levels. The findings displayed in Table 5 present the means of the three predictor variables between the two completed education levels, bachelor's degree, and master's degree, respectively. These findings indicate that for the first predictor variable, age, there was a difference between the means (M_1 - M_2 = 2.42) of the two completed education levels.

Table 5

Group Statistics

Group Statistics

	What is the highest level of education you have completed ? (Please choose one)	N	Mean	Std. Deviation	Std. Error Mean
What is your age ?	Bachelor's degree	13	43.62	10.634	2.949
	Master's degree	55	41.20	11.648	1.571
Connectivity	Bachelor's degree	13	85.6923	16.51961	4.58171
	Master's degree	55	87.3818	13.37008	1.80282
ILOC	Bachelor's degree	13	87.3846	5.70874	1.58332
	Master's degree	55	85.3455	8.69060	1.17184

Similarly, the standard error of the mean ($SEM_1 – SEM_2$ = 1.378) also differed between the two completed education levels. For the second predictor variable, connectivity, there was also a difference between the means *(*M_1 - M_2 = -1.689) of the two completed education levels. The standard error of the mean ($SEM_1 – SEM_2$ = 2.77889) also differed between the two completed education levels. Moreover, for the third predictor variable, internal locus of control, there was also a difference between the means *(*M_1 - M_2 = 2.0391) of the two completed education levels. The standard error of the mean ($SEM_1 – SEM_2$ = 0.41148) also differed between the two completed education levels.

The findings of the Independent Samples *t*-Test for the three predictor variables, age, connectivity, and internal locus of control were not statistically significant. For the predictor variable, age, the Independent Samples *t*-Test results were as follows: $t(66) = .683$, $p = .497$. For the predictor variable, connectivity, the Independent Samples *t*-Test results were as follows: $t(66) = -.391$, $p = .697$. For the predictor variable, internal locus of control, the Independent Samples *t*-Test results were as follows: $t(66) = .804$, $p = .425$. Because of these findings, I failed to reject the null hypothesis for Research Question 4.

In order to determine whether the assumption of homogeneity of variances was violated, I examined the values presented in Table 6 for the Levene's test that was conducted along with the Independent Samples *t*-Test. The significance of the (*F)* statistic for each of the 3 predictor variables, age, connectivity, and internal locus of control was ($p>.05$), which indicates that the assumption for homogeneity of variances was met. In other words, it is assumed that the variances are equal (Frankfort-Nachmias & Leon-Guerrero, 2015).

Table 6

Independent Samples Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference	Lower	Upper
What is your age ?	Equal variances assumed	.072	.790	.683	66	.249	.497	2.415	3.537	-4.647	9.478
	Equal variances not assumed			.723	19.424	.239	.478	2.415	3.342	-4.568	9.399
Connectivity	Equal variances assumed	.794	.376	-.391	66	.348	.697	-1.68951	4.31609	-10.30687	6.92785
	Equal variances not assumed			-.343	15.919	.368	.736	-1.68951	4.92364	-12.13150	8.75248
ILOC	Equal variances assumed	2.341	.131	.804	66	.212	.425	2.03916	2.53781	-3.02775	7.10607
	Equal variances not assumed			1.035	26.950	.155	.310	2.03916	1.96980	-2.00289	6.08121

Summary

Persistence has become problematic in distance learning. Findings from recent studies have shown that 29% of learners in the United States enrolled solely in distance learning courses (Ginder et al., 2018). However, findings from a number of studies have indicated that rates of persistence for courses delivered online continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses delivered face-to-face (Muljana & Luo, 2019).

The purpose of this quantitative nonexperimental study was to examine whether perceived connectivity, perceived internal locus of control, and age predict persistence in

online master's degree programs. The study sample ($N = 68$) consisted of individuals who have completed an online master's degree program within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years. The findings of the multiple regression analysis indicate that 27.9% of the variability in the criterion variable, persistence, was explained by the combination of the predictor variables connectivity, internal locus of control, and age. In addition, the adjusted R square, an effect size, indicates that 24.5% of the variability of the criterion variable, persistence, was explained by the combination of the three predictor variables, age, connectivity, and internal locus of control. Moreover, the three predictor variables had a statistically significant relationship with the criterion variable, persistence. Accordingly, I rejected the null hypotheses for research questions one, two, and three.

In addition, I conducted an Independent Samples *t*-Test to compare the means of the three predictor variables, age, connectivity, and internal locus of control, between the two completed education levels, bachelor's degree, and master's degree, respectively. The findings of the *t*-tests were not statistically significant. For the predictor variable, age, the Independent Samples *t*-Test results were as follows: $t(66) = .683$, $p = .497$. For the predictor variable, connectivity, the Independent Samples *t*-Test results were as follows: $t(66) = -.391$, $p = .697$. For the predictor variable, internal locus of control, the Independent Samples *t*-Test results were as follows: $t(66) = .804$, $p = .425$. Because of these findings, I failed to reject the null hypothesis for research question four.

In Chapter five, I will restate the purpose of the study and the rationale for conducting it. I will provide a summary of the study's central findings, discuss how its findings relate to findings in previous literature, and make recommendations for further research. In addition, I will describe how the study may relate to positive social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Persistence has become problematic in distance learning. Ginder et al. (2018) stated that 29% of learners in the United States enrolled solely in online courses. However, findings from various studies have indicated that rates of persistence for courses delivered online continue to be low (Lakhal et al., 2021; Laurie et al., 2020) compared to courses in which instructors and learners interact at the same time and the same place (Muljana & Luo, 2019). Because of this, it has become increasingly important to develop approaches to ameliorate persistence.

The purpose of this quantitative nonexperimental study was to examine whether perceived connectivity, perceived internal locus of control, and age predict persistence in online master's degree programs. The study participants ($N = 68$) completed a survey comprised of three instruments: Bolliger and Inan's (2012) OSCS, Duttweiler's (1984) Internal Control Index, and the Grit Scale (Duckworth et al., 2007). The participants' demographic information provided data for their ages, highest completed level of education, gender, and whether online courses were their preferred instructional format. Multiple linear regression analysis was used to address research questions one to three. An Independent Samples *t*-Test was used to address research question four.

Interpretation of the Findings

I used multiple regression to examine how the continuous predictor variables, perceived connectivity, perceived internal locus of control, and age explained the value of the continuous criterion variable, persistence. Rotter's (1966) locus of control theory,

Moore's (1997) transactional distance theory, and Rovai's (2003) composite persistence model provided the theoretical and conceptual frameworks for the study.

Research Question 1 is as follows:

RQ1: To what extent will perceived connectivity predict persistence in online master's degree programs?

The results of the multiple linear regression showed that the predictor variable connectivity ($p = .049$) had a statistically significant relationship with the criterion variable persistence. Accordingly, I rejected the null hypothesis for Research Question 1. According to Jamison and Bolliger (2020), study findings have denoted that a high degree of connectedness and interactivity is associated with increased retention as well as learner satisfaction in courses that are offered online. In addition, the authors stated that other study findings have indicated that feeling connected lessens learners' perceptions of isolation and improves academic performance and program completion (Jamison & Bolliger, 2020).

Research Question 2 is as follows:

RQ2: To what extent will perceived internal locus of control predict persistence in online master's degree programs?

The results of the multiple linear regression showed that the predictor variable internal locus of control ($p < .001$) had a very statistically significant relationship with the criterion variable persistence. Accordingly, I rejected the null hypothesis for Research Question 2. Findings from previous research studies have indicated that an internal locus of control is predictive of learner persistence and completion in online courses (Lee &

Choi, 2011). In addition, findings from numerous studies have indicated that an internal locus of control correlates positively with persistence in an online setting (Lee et. al., 2013).

Research Question 3 is as follows:

RQ3: To what extent will age predict persistence in online master's degree programs?

The results of the multiple linear regression showed that the predictor variable age also had a statistically significant relationship ($p = .043$) with the criterion variable persistence. Accordingly, I rejected the null hypothesis for Research Question 3. In Rovai's composite persistence model, age is one of the learner attributes related to persistence in distance learning. A study conducted by Lakhal et al. (2021) examined various factors, including age, to ascertain whether they have an effect on persistence in postsecondary distance learning courses. Their findings indicated that learners' satisfaction in distance learning courses had a greater effect on persistence among learners who were older and learners who had previous experience with distance learning courses (Lakhal et al., 2021).

Research Question 4 is as follows:

RQ4: To what extent will the means vary for the predictor variables (connectivity, internal locus of control, and age) between individuals who completed either a master's degree program or a bachelor's degree program?

The findings of the Independent Samples *t*-Test for the three predictor variables, age, connectivity, and internal locus of control were not statistically significant. For the

predictor variable, age, the Independent Samples *t*-Test results were as follows: $t(66) = .683$, $p = .497$. For the predictor variable, connectivity, the Independent Samples *t*-Test results were as follows: $t(66) = -.391$, $p = .697$. For the predictor variable, internal locus of control, the Independent Samples *t*-Test results were as follows: $t(66) = .804$, $p = .425$. Because of these findings, I failed to reject the null hypothesis for Research Question 4.

Schroeder et al. (2016) conceptualized connectivity as learners' perceptions of community, as well as involvement, in distance settings. Kaufmann and Vallade (2022) cited Kaufmann et al.'s 2016 study in which learners' connectedness involved their perceived opportunities to communicate with other learners. Kaufmann and Vallade explained that learners are not physically proximate to other learners in online settings. The interactions in such settings necessitate purposive course planning and facilitating.

Armstrong et al. (2021) stated that internal locus of control refers to the idea that the capacity to attain results is attributable to one's behavior. Joo et al. (2011) cited findings from previous studies that, in terms of persistence, learners who have an internal locus of control conclude their studies. Furthermore, Joo et. al stated that earlier study findings suggested that internal locus of control, as well as the degree of support from educational institutions, are pertinent factors relating to learner persistence.

According to Lakhal and Khechine (2021), findings from earlier studies differed on how age or learners' other attributes influence persistence in courses delivered online. Park and Choi (2011) examined whether particular learner attributes, such as gender, age, and level of education, vary among learners who persist, or do not persist, in courses delivered online. Park and Choi related that earlier studies lacked a consensus as to how

strongly learner attributes affect decisions to continue, or not continue, in online courses. The findings of Park and Choi's 2011 study indicated that online learners who continued, or did not continue, in online courses, differed in other areas such as how they perceived support (from family and organization) and the relevance of the courses. Such support, along with learner attributes, were shown to be especially predictive of decisions to continue or not continue in online courses.

Limitations of the Findings

The findings of the study are not generalizable to the population under study. Random sampling, a probability sampling technique, was not utilized to obtain a sample for the study. I used a convenience sample for the study, which is a type of non-probability sampling. Using stratified random sampling (Fritz & Morgan, 2012) could enhance the possibility of obtaining a sample that is representative of the population being studied. It may be difficult to ascertain the extent to which the sample is representative for a non-probability sampling (Fritz & Morgan, 2012).

Furthermore, the sample of participants ($N = 68$) was 88% of the sample size of 77 that was determined by power analysis. A low response rate could also result in a sample that is unrepresentative (Fritz & Morgan, 2012). As presented in Appendix A, (Table A2 and Table A3), the data distribution for the participants was skewed toward one completed education level (master's degree) and one gender (females). Consequently, the study was not externally valid. If a study's findings are externally valid, the findings may generalize to be pertinent to everyday contexts (Warner, 2013).

Recommendations

For subsequent studies, I would recommend replicating the study in graduate programs across multiple university settings. The inclusion criteria would not change. Adult learners (minimum 18 years old) who have completed an online master's degree within the last 5 years, or individuals who enrolled in, but did not complete, an online master's degree program within the last 5 years would be recruited as study participants. However, since the study would include multiple universities, it would be necessary to obtain permission to recruit participants.

Another possible issue to include within the study would be whether the Covid-19 pandemic contributed to attrition in online master's degree programs. In this study, (n = 13, 19.1%) of the participants, enrolled in, but did not complete, an online master's degree program within the last five years. There are myriad reasons that learners do not complete an online advanced degree program. Employment, learner dissatisfaction, and health concerns are all issues that could contribute to attrition in such programs. The Covid-19 pandemic could have been an additional stressor that contributed to learner attrition. Ogunmokun et. al (2022) discussed previous study findings of difficulties that could result in learner attrition online. Issues pertaining to technology and pedagogy frequently impede learning management systems' efficacy, which can possibly result in attrition (Ogunmokun et. al, 2022).

Instead of convenience sampling, stratified random sampling (Fritz & Morgan, 2012) could be used to obtain a suitable sample size for the study. This type of sampling allows researchers to sort the population into strata or groups based on pertinent characteristics (Fritz & Morgan, 2012). Doing so could result in a greater number of participants, a higher response rate, and, perhaps, a more even data distribution relating to participants' genders and completed education levels for the study. Obtaining participants through stratified random sampling across multiple graduate programs could result in findings that generalize to the population under study. In other words, the study would be externally valid.

Positive Social Change Implications

Low levels of retention are ascribed to lower performance within postsecondary institutions. This can impact such institutions' capacity to obtain government-related funding (Haydarov et al., 2013). In addition, low retention rates in programs negatively affect efforts toward recruiting students and promoting programs (Willging & Johnson, 2004). This study could provide insights that would help researchers, online educators, online course designers, and online program administrators to improve the quality of design practices and pedagogic practices in advanced distance learning degree programs and ameliorate persistence and graduation rates.

Persisting until completion of an advanced online degree program benefits learners and postsecondary institutions, as well as society. Advanced online degree completion promotes positive social change. It enhances the employment prospects of individuals from diverse backgrounds. Moreover, individuals who complete their

advanced online degree programs gain the requisite knowledge and skills needed to improve conditions within their communities.

Conclusions

In contrast to learners in courses offered at the same time and same place, online learners are separated physically (Bollinger & Inan, 2012; Jamison & Bolliger, 2020; Rovai & Wighting, 2005). The rapid growth of distance learning courses, along with their attendant low rates of persistence, is an issue that ought to be highly relevant to learners, educators, and postsecondary institutions (Lakhal et al., 2021). For that reason, connectivity has become integral to distance learning environments. A better understanding of the learner attributes that contribute to persistence in online master's degree programs is central to the continued progression of such programs.

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Appendix: Title of Appendix

Table A 1

What is your age ?

	N	%
24	2	2.9%
25	1	1.5%
26	2	2.9%
28	2	2.9%
29	2	2.9%
30	3	4.4%
31	2	2.9%
32	1	1.5%
34	3	4.4%
35	8	11.8%
37	2	2.9%
38	1	1.5%
39	4	5.9%
40	2	2.9%
41	4	5.9%
42	4	5.9%
43	1	1.5%
44	1	1.5%
45	2	2.9%
46	2	2.9%
47	1	1.5%
48	2	2.9%
49	1	1.5%
50	1	1.5%
53	1	1.5%
54	1	1.5%
55	4	5.9%
59	2	2.9%
61	1	1.5%
62	1	1.5%
65	1	1.5%
68	3	4.4%

Figure A 1

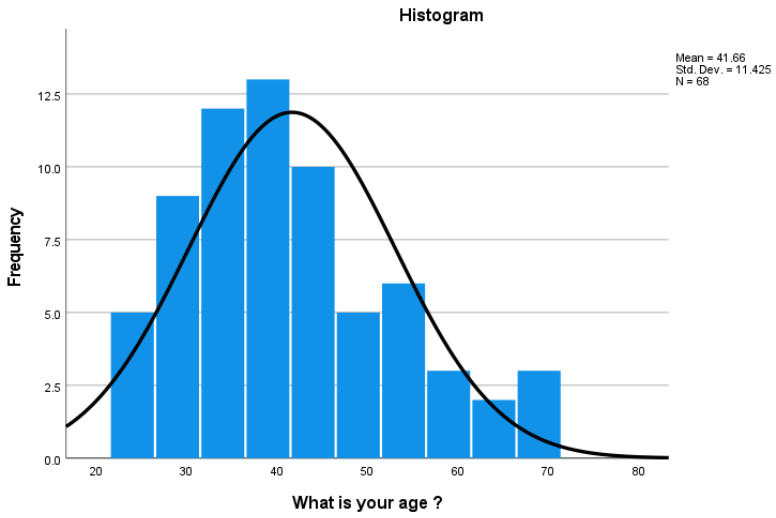

Table A 2

What is the highest level of education you have completed ? (Please choose one)

	N	%
Bachelor's degree	13	19.1%
Master's degree	55	80.9%

Table A 2

What is your gender?

	N	%
Female	55	80.9%
Male	13	19.1%

Are online courses your preferred format for instruction?

	N	%
Yes	61	89.7%
No	7	10.3%