

Identifying Factors Contributing to Student Retention and Persistence in
Online deved© (Developmental Education) Courses

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ABSTRACT

This quantitative study evaluates and investigates the theoretical foundations of Kember's (1995) student progress model. It draws upon the framework developed by Lint (2011) in her test of Kember's model. Kember's model examines the influence of several factors on student intention to persist in online education: social integration, academic integration, external attribution, academic incompatibility, student performance, and cost-benefit analysis. The model was tested in the context of students enrolled in a suite of developmental education (deved) courses that were delivered online. The primary method of data collection in this study was a survey of a sample of 520 students who were concurrently enrolled at public community colleges in Illinois while they engaged courses in the deved suite. Logistic regression and multiple regression analysis were utilized to analyze the effect of modeled factors on student persistence. Findings of previous studies have consistently indicated that negative external attribution is a significant factor that influences student persistence. This investigation found that external attribution had a significant effect on student persistence and that academic incompatibility, academic integration and social integration, respectively, had increasingly less corroborated, significant effects on student persistence. While external attribution initially appeared to display a significant impact on persistence, in the end neither cost-benefit analysis nor student performance (GPA) significantly mediated the influence of any of the main independent variables on persistence. The findings of this study provide valuable insight into current issues in online learning regarding student persistence, college readiness, and developmental education pedagogy.

Keywords: non-traditional student, developmental education, online learning, persistence

CHAPTER I: Introduction

Background

Student persistence in on-ground and online courses has become a critical issue for both students and institutions alike, as it has a direct effect on student accomplishment of educational goals and it also financially sustains institutional objectives of teaching and learning for students (Allan & Seaman, 2014; National College Educational Service, 2012). The purpose of this quantitative analytic study is to evaluate and test Kember's (1995) student progress model, specifically by examining the impact of several factors on student persistence and completion in a core of developmental education (deved) courses delivered online.

In recent years, distance education has been transformed from an obscure delivery model into what is now being referred to with various terms such as Massive Open Online Courses (MOOCs), hybrid blended learning and e-learning (Allen & Seaman, 2014; NCES, 2012). Administrators in United States Higher Education (USHE), who once disregarded this delivery method, must now seriously consider the ramifications of *not* instituting an aggressive and sustainable online presence. Current trends in the field of e-learning indicate a major shift in pedagogical perspectives, theoretical frameworks and expected outcomes for the student (Allen & Seaman, 2013; Couturier, 2011). The increasing call for accountability in online education illuminates the current need in USHE for tested and reliable methods of evaluating student completion and persistence in online education (NCES, 2012).

The growth in online delivery is at an all-time high with over 6.1 million students having enrolled in at least one online course during the Fall 2012 Term; this number represented thirty-two percent of all students enrolled in USHE (Allen & Seaman, 2014; NCES, 2012). These data

support the position that online learning is not only the current trend in USHE, but the future of USHE as well.

College Readiness and Persistence

The majority of institutions in USHE require students to complete their developmental education (i.e., college-readiness) sequences before they are allowed to enroll in college-level courses (Allan & Seaman, 2014; NCES, 2012). Students mandated into a sequence of multiple developmental courses in the same subject could spend a year of course-taking before their developmental education requirements are fulfilled. However, less than fifty percent of students mandated into developmental courses actually complete the entire sequence to which they are referred (Bailey, Jeong, & Choo, 2010; NCES, 2012).

The persistence and completion percentages are even lower for men, non-traditional students, minority students, part-time students, and students enrolled in workforce development programs (NCES, 2012). Recent data support this position, as eighty-five percent of all minority students are mandated into developmental courses each year (ACT, 2014; Allan & Seaman, 2014). Students assigned to the lowest levels of math remediation are the least likely to advance to college-level courses, with only ten percent of this sub-group eventually completing college-level courses (Bailey, Jeong, & Choo, 2010; NCES, 2012).

The United States will need to increase post-secondary degree production by almost fifty-three percent annually, producing an additional 781,000 degrees per year, in order to produce the trained workforce the society will require by 2025 (Vandall, 2010). Finding ways to encourage student persistence and completion in academic programs is a consistent challenge for institutions and is identified as a national problem with respect to students who choose e-learning courses (Dizik, 2010; NCES, 2012). Data show that students tend to have stronger positive

opinions of e-learning environments than of traditional, “brick and mortar” learning environments (Lei & Gupta, 2010; Riffell & Sibley, 2005).

Kember’s Model

Kember built upon the inconsistency in literature regarding student persistence in distance education and developed, tested and re-tested his model (1989, 1995) over a seven-year time period. His work compared distance student experiences to those of traditional, on-ground students. In the course of his extensive research, Kember (1995) identified factors that could affect distance students that could be key in evaluating student dropout behavior, thereby affecting persistence. Kember determined, in his longitudinal study, the significance of five factors as indicators of student persistence. These factors were developed into the Distance Education Student Progress (DESP) survey instrument, which he administered to students. The factors of social and academic integration, student characteristics, performance, and external attribution are key areas of focus and were determined by Kember (1991, 1995) to be leading indicators of persistence.

Kember (1995) based his theory of student progress on a process of student adaptation and development that was understood to be influenced by intervening variables such as quality of course and academic support. It is difficult to effectively identify reasons for withdrawal under previous models because of student withdrawal having been considered normal and attributable to traditional variables (Tinto, 1975). Students who enroll in e-learning courses are normally maintaining various responsibilities of commitment to work, family, social lives, and study. This implicitly distinguishes them from first-time, full-time, on-campus students focused more on a traditional academic life (Kember, 1995).

Developmental Education

Students required to take deved courses are far less likely to persist or to complete a degree or certificate than are those students not mandated into deved courses (Allan & Seaman, 2014; Harris, 2010; NCES, 2012). This option for a student entails the following: increased costs for course work, failure to receive college credit for (deved) coursework, and the wasting of valuable time towards completion of a certificate or degree. Current research indicates that seventy-five percent of all college students are required to enroll in at least one remedial reading course and that only twenty-seven percent of those who require a deved course ever earn a bachelor's degree (American College Testing, 2014; COE, 2013; Moore & Kearsley, 2012). An opportunity now emerges with e-learning as a delivery method in deved, simultaneously creating a possible reduction in cost as well as a goodness-of-fit with the needs of many non-traditional students, who tend to enroll in college-readiness courses.

Distance Education/Online Learning

Although progressive forms of distance education have been used to instruct students in USHE for more than one hundred years, the rapid growth of student learning in online formats should be investigated further and this investigation should be applied to a diverse array of disciplines (Moore & Kearsley, 2012; NCES, 2012). Online options now offer students access to academic courses at a lower cost and with lower demand for physical classroom attendance. This lower requirement for on-ground commitment reduces disruption to students' professional and personal lives, allowing many a more convenient option for academic instruction.

E-learning as a credible alternative method of delivery in deved has yet to be fully tested. Indeed, until this research, no data previously has existed on deved courses instructed entirely online. Discovery of best practices in the online delivery of developmental education courses to

students could increase college readiness and student preparedness. Evaluating and suggesting ways to arrange learning so as to maximize students' successful completion has important policy implications (Tinto, 1993; Kember, 1995; Lint, 2011).

The deved courses studied in this research are often referenced by several names, such as college-readiness and remedial education courses. Regardless of the name used, these courses are generally mandated by institutions of higher education for students' entry into college-level course work. Data show that student performance in such courses is customarily considered an indicator of a student's likelihood of persistence or success in college (Epper & Baker, 2009; NCES, 2012). To increase higher education attainment, institutions must work systematically to close achievement gaps, specifically for students determined to be in need of deved courses. Increasing retention rates saves money to both students and USHE, while also supporting low-income and minority students' specific academic and career goals and needs.

Recent research led by a collaboration of governmental agencies, non-profits and private institutions has received financial support from government and private sources to provide incentives for redesigning and for assessing alternative approaches to institutions' provision of remedial and developmental education (Carnegie Foundation, 2012; Couturier, 2011; Zachry & Schneider, 2010). Deved courses are traditionally structured in a sixteen-week semester, lecture or seminar format in which a student takes one deved course in a given subject before moving on to the next course in the sequence.

An increasing number of pedagogy projects now incorporate innovative learning technology into instruction, such as self-directed learning, learning labs, online-learning models, and the use of high-tech classrooms (Epper & Baker, 2009; Farmer, 2009; Lint, 2011). Newer models of remediation attempt to better identify student academic needs and support them

through deved courses. Current research does not suggest that students enrolled in online condensed courses, self-paced courses, and self-directed deved courses show higher rates of persistence than students taking traditionally-structured deved courses; nevertheless, causal questions about the effect of these programs on student persistence and outcomes remain unanswered, requiring further study (Epper & Baker, 2009; Jenkins, Speroni, Belfield, Jaggars, & Edgecombe, 2010; NCES, 2012).

Statement of the Problem

USHE and the wider society currently face a gaping need for a more effective approach to the tremendous social issue of developmental education. Lack of preparedness for college-level courses is an accepted leading indicator of a student's likelihood of persisting with and completing their studies (ACE, 2014; NCES, 2012). Those students required to take deved courses are far less likely to persist, complete or be workforce-ready than their counterparts (U.S. Department of Labor, 2014). Of those who require at least one remedial reading course, a meager twenty-seven percent go on to earn a bachelor's degree (COE, 2013).

Most college students require some form of developmental education (ACT, 2014). Data show that only twenty-six percent of college-bound high school graduates are college-ready when they arrive on campus (ACT, 2014). In 2012, seventy-three percent of all enrolled students at community colleges were required to take at least one developmental course and fifty-six percent required two or more courses (NCES, 2012). This situation has far-reaching ramifications. U.S. Census numbers reveal that over forty-two million Americans between the ages of 18 and 64 are in need of some form of higher education training but are not adequately prepared for such training (NCES, 2012). Of those forty-two million, over eight million have a high school diploma or less and require English language instruction; fifteen million have a high

school diploma but do not earn a livable wage and are not prepared for post-secondary education; and nineteen million do not have a high school diploma or an equivalent (NCES, 2012). For this population, deved offered in an e-learning format would create access to teaching and learning during periods of the day when traditional college courses generally are not available, such as in the middle of the night and on weekends.

Although many students who are mandated into deved courses never enroll, the vast majority of college students who enroll in traditional, on-ground deved courses do not successfully complete them (Pimentel, 2013). This fact contributes to the great demand for the provision of ongoing workforce development education for the average American worker—an undertaking that comprises a vast and critical component of USHE. Statistical data available from the U.S. Department of Labor (DOL) reveal that two-thirds of the United States labor force has less than a four-year degree, including nearly half of those who are in professional occupations and one-third of those with careers in management roles (DOL, 2014). It pays for workers to earn these credentials. According to the DOL (2014), workers with at least an associate's degree earned eight-thousand dollars more per year, on average, than those whose highest degree was a high school diploma.

It is primarily the instruction of the adult student who returns to USHE for training and certifications for which this research is paramount. Pedagogy informed by the establishment of a base of knowledge for e-learning in deved might have a significant impact on student access to as well as student success within higher education. The critical, future success of our society rests upon our capacity to find more effective approaches to developmental education.

Scholars have suggested that future research address these problems by examining persistence in online courses (Allan & Seaman, 2014) and uncovering new ways to potentially

improve the predictive measurement of online students in the future by moving beyond merely testing students. The identification of statistically significant best practices in online learning improves the external validity of the predictor variable (Kember, 1995; Lint, 2011).

Purpose of the Study

The purpose of this quantitative analytic study is to evaluate and test Kember's (1995) student progress model, which examines factors having direct or indirect effects on student persistence in e-learning courses. The analysis will accomplish this, within the context of an online deved educational experience, by identifying the relationships between, on the one hand, variables such as student perceptions, course performance, and cost-benefit analysis, and on the other hand, student persistence and completion.

Kember's (1995) model consists of two paths, referenced as the positive path and the negative path. Students on the positive path progress to the social integration stage of the model, which measures factors such as enrollment encouragement, study encouragement, and family environment. If students are on the positive path, they will progress to the academic integration stage of the model, which measures factors such as student approach to learning, motivation for taking the course, and positive course evaluation. Students on the negative path at the stage of entry characteristics progress to the external attribution stage of the model, which measures items such as insufficient time, unexpected life events, and personal distractions. Students who continue on the negative path advance to the academic incompatibility stage of the model. Both paths then move on to a later stage at which students' grade performance and their analysis of the costs and benefits of continuing theoretically affect whether they will persist in coursework or not (Lint, 2011).

Research Questions and Hypothesis

This study investigates the linkage between, on the one hand, theory, and on the other hand, the self-reported student perspective with respect to issues of student persistence in e-learning. To accomplish this the study highlights predictive factors by testing the Kember (1995) student progress model with regard to influence on persistence in e-learning courses. The main theoretical support of this study is based on the model of student progress proposed by Kember (1995) and recreated by Lint (2011). The study engages three null hypotheses and three alternative hypotheses based on three primary research questions.

RQ1. Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, d) academic incompatibility and student persistence? Does the relationship vary in statistical significance with respect to student characteristics and learning style?

Hypothesis 1: That a statistically significant relationship will be found between student perceptions and student persistence.

RQ2. Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, d) academic incompatibility and student persistence as mediated by student performance (defined by GPA)?

Hypothesis 2: That student performance (GPA) will be found to have a statistically significant mediating role on the relationship between student perceptions and student persistence.

RQ3. Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, and d) academic incompatibility and student persistence as mediated by cost-benefit analysis?

Hypothesis 3: That student cost-benefit analysis will be found to have a statistically significant mediating role on the relationship between student perceptions and student persistence.

Theoretical Framework

This quantitative analytic study builds upon a lineage of theoretical work that has been concerned with understanding factors that shape college student retention. In his seminal work and theory of suicide, Durkheim (1997) foregrounds the critical concept of social integration. Based on Durkheim's work, Spady (1971) developed the first theoretical model of student educational attrition. Tinto (1975) modified Spady's model in his study of student integration into the academic setting. In his model, Tinto (1975) emphasized the interaction between students and the college environment and he highlighted the student's ability to interact successfully with faculty, students and student support. The student integration model of Tinto (1975) has undergone considerable testing, including testing for validity (Brown, 2007; Cabrera, Nora, & Castaneda, 1993). Despite the validity and impact of Tinto's model, Bean and Metzner (1985) assert that Tinto's model (1975) was less relevant in identifying social interactions between students and faculty.

Kember contends that the Tinto model is best when applied to the traditional student. His hypothesis was that modifications to the model would advance online learning courses. Kember is suggesting that factors outside the academy (e.g. school, employment, spouse, family) play a significant role in whether a student will persist or complete. In prior support of Kember's view, Bean and Metzner (1985) had found that non-traditional students are disproportionately more affected by the external environment than are traditional students, such as through needing to balance academic work with family and work obligations. Kember et al., (1995) labels this set of factors "external attribution" and identifies it as a variable that affects student attrition.

Theory of Student Retention

The student integration model of Tinto (1975) has undergone considerable testing, including testing for validity (Brown, 2007; Sandler, 2000; Cabrera, Nora & Castaneda, 1993). Bean and Metzner (1985) assert that Tinto's model (1975) was not helpful with respect to identifying social interactions between students and faculty. This lack of validity was attributed to a lack of data having been collected on external factors that might contribute to a student's desistance (lack of persistence). The Bean and Metzner (1985) model was the first to find that non-traditional students are disproportionately more affected by what they termed the external environment than are traditional students. Kember (1995) labels this "external attribution," as a variable affecting student attrition (Lint, 2011).

The present analysis draws most specifically upon the model developed by Kember (1995). Kember's earlier model (1989) differentiates itself from Bean and Metzner's (1985) work by elevating the focus placed on external attribution. Though Tinto's (1975) model examines student persistence in the learning environment and identifies social integration as having a direct effect on student persistence, Kember (1995) in later modifications to his model further elaborated this as four key factors of measurement: social integration, academic integration, external attribution, and academic incompatibility (Lint, 2011).

Thompson (1999) and Houle (2004) attempted to verify reliability and validity of the theory; their results differed in the extent of the influence of the four independent variables on student persistence. This divergence could be attributed to the fact that Kember's (1995) model predates the proliferation of online courses that occurred after 1995. In 2000, five years after Kember's (1995) last retest, less than four percent of all students in USHE at the time were

enrolled in a distance education course; this number has risen to over twenty-five percent in 2012, an increase of over 600 percent (Allen & Seaman, 2014).

Nature of Study

This study uses a quantitative survey methodology, developed by Lint (2011), to test the theoretical foundations of the Kember (1995) student progress model within deved and to examine the relationships between the elements of Kember's model. Thompson (1999), Houle (2004), Harlow (2006), Porta-Merida (2009) and Lint (2011) verified the reliability and validity of Kember's (1995) theoretical model, yet their results differ slightly in the magnitude of various factors' influence on student persistence. The present study examines the direct or indirect effect of factors that shape student persistence and completion in e-learning courses within the area of deved by identifying the relationships between, on the one hand, student perceptions (social integration, academic integration, academic incompatibility, external attribution), course performance, and cost-benefit analysis, and on the other hand, student persistence and completion. The primary method of data collection in this quantitative study was a survey used to explore the relationships among variables. The sample population of this study was 520 students who were concurrently enrolled in community colleges in Illinois, USA.

Logistic regression and multiple regression analysis were utilized to analyze the survey data provided by Catalyst Educational Research Center, Inc. (CERC). Through the perspective of Kember's (1995) model of student progress, the study investigates relationships between the dependent variable of persistence and the independent variables of student progress factors (social integration, academic integration, external attribution, academic incompatibility), course performance, and cost-benefit analysis.

Definitions

Attainment: Attainment represents the level of education completed (i.e., high school diploma or equivalency certificate, bachelor's degree, or master's degree) by a student in a course of study (NCES, 2012). An institution's loss of students through attrition is now considered a key indicator of student persistence.

Computer Adaptive Placement Assessment and Support System (COMPASS): The COMPASS is a series of untimed, computerized placement tests developed by American College Testing (ACT) service that assesses college student readiness (NCES, 2012). This test is used to identify student strengths, knowledge and skills required to succeed in specific subject areas.

Completer / Completion rate: A completer is a student who finishes an academic course or program. The definition can also reference the number of degrees and other formal awards (certificates) conferred (Heyman, 2010). These data are reported to NCES by level (associate's, bachelor's, master's, doctoral, and first-professional), as well as by length of program for some. Both are reported by race/ethnicity and gender of recipient, and field of study, using the Classification of Instructional Programs (Heyman, 2010; NCES, 2012).

Student Progress Factors: Kember (1995) identifies four constructs (social integration, academic integration, external attribution, and academic incompatibility) as elements of student progress. Kember (1995) built these constructs, together with background characteristics, into a causal model of student progress and tested it using path analysis. He concluded that the model was robust in measuring adult student persistence.

Developmental Education (deved): According to the NCES (2012), developmental education is the integration of academic courses and support services, guided by the principles of adult learning and development. The courses are intended to offer remediation in English, math,

reading and comprehension in order to prepare a student for college-level instruction (NCES, 2012). Often referenced as college-readiness courses, they are mandated for students by postsecondary institutions, based on students' COMPASS testing placement scores.

On-line Learning: Referenced as e-learning, hybrid courses and MOOCs, these courses are often based primarily online and can be blended to include a varying extent of on-ground attendance (NCES, 2012).

Traditional Student: As defined by NCES (2012), a traditional student is a first-time college student, aged 18-22, who begins college during the same calendar year as their graduation from high school.

Non-Traditional Student: Commencing in a 1996 study, the NCES (2012) definition of a non-traditional student includes any student who satisfies at least one of the following characteristics: delays enrollment (does not enter postsecondary education in the same calendar year that he or she finished high school); attends part-time for at least part of the academic year; works full-time (35 hours or more per week) while enrolled; is considered financially independent for purposes of determining eligibility for financial aid; has dependents other than a spouse (usually children, but they may also be caregivers of sick or elderly family members); is a single parent (either not married, or married but separated, and has dependents); or does not have a high school diploma (completed high school with a GED or other high school completion certificate, or did not finish high school).

Persistence: Persistence refers to a student's continuation of course work from semester to semester that leads to graduation (NCES, 2012). As many as three indicators are sometimes used to measure student persistence: a student's intent to continually enroll in the upcoming

semester, a student's transfer to another institution, and a student's graduation (Allan and Seaman, 2008) defined student persistence by including transfer to other colleges.

Retention: A measure of the rate at which students persist in their educational program at an institution, expressed as a percentage. For four-year institutions, this is the percentage of first-time bachelors (or equivalent) degree-seeking undergraduates from the previous fall who are again enrolled in the current fall. For all other institutions this is the percentage of first-time degree / certificate-seeking students from the previous fall who either re-enrolled or successfully completed their program by the current fall (NCES, 2012).

Social Integration: The extent to which a student has positive / encouraging perceptions of, and interactions with, the environment of the campus or college, eliciting a state of feeling connected to and belonging to the social environment or community. This includes contact with peers and is dependent upon a student's perception of the institutional culture. Tinto (1993) theorized that to persist, students need integration into formal (academic performance) and informal (faculty/staff interactions) academic systems and formal (extracurricular activities) and informal (peer-group interactions) social systems. This theory assumes that a student's decisions to enroll and to persist in an academic course are dependent on their academic experience.

Academic Integration: Kember (1995) established that academic integration encompasses all elements of contact between an institution and the student, such as use of the library, participation in the classroom, seeking the help of mentors, tutors or academic counselors, use of a computer lab outside of class, and discussing academic topics with instructors outside of the classroom (Kraemer, 1993).

External Attribution: First introduced by Kember (1995), external attribution encompasses the external causes in a student's personal life, such as insufficient time for study,

work-related support, family, friends, social networking, and unexpected life events that prevent the student from finishing a course or a plan of study.

Academic Incompatibility: According to Kember, Murphy, Siaw, and Yuen (1991) and Kember, Lai, Murphy, Siaw, and Yuen (1995), academic incompatibility manifests as a surface approach to learning, a non-intrinsic motivation, a student's negative evaluation of a course, and the failure to receive a passing grade in a course.

Assumptions, Limitations and Delimitations

Assumptions

It is assumed that the 520 participants in this study answered self-report measures honestly and that the instruments used accurately measured what they purport to measure with the same level of reliability and validity found in previous analyses for student persistence in online courses. Kember (1995) created the Distance Education Student Progress (DESP) instrument, which has been widely tested among a diverse audience of adult students (Lint, 2011; Woosley & Miller, 2009; Senhouse, 2008). It is assumed that study participants had varying work experiences, personal backgrounds, personality traits, and cognitive abilities that were evenly distributed (Lint, 2011). In data analysis, it will be assumed that the data will be normally distributed and that the power analysis (as defined in Chapter 3) will provide ample power to detect statistical significance across the hypotheses.

Limitations

Despite recent studies showing that Kember's (1995) instrument can predict student progress and identify direct or indirect effects of student persistence in online education by identifying the relationships between variables (Lint, 2011; Thompson, 1999), little or no

evidence is available on student persistence in deved courses delivered online. Hence, even though the DESP is a reliable and valid instrument (Lint, 2011), its history of low validity for explaining criterion variables creates a threat to internal validity, placing limits on the ability to rule out confounding and extraneous variables as an explanation for statistically significant findings (Creswell, 2008).

The purpose of this quantitative analytic study has been to evaluate and test Kember's (1995) student progress model that examines the direct or indirect effects on student persistence in developmental education, e-learning courses by identifying the relationships between several variables (Lint, 2011). The purpose, then, was to discover whether the DESP as administered in this study would be predictive, which is vital, because no discernable studies of online education conducted thus far have investigated students in deved courses. Most specifically, the purpose of the research was to offer theoretical validation and feasibility for justifying future research in the area of online deved courses.

Delimitations

This study has inclusionary delimitations associated with choice of participants and instrumentation, and exclusionary delimitations associated with variables. First, this study was limited to self-selecting participants who attended community colleges in Illinois, spoke English as their primary language, and lived in the Chicago metropolitan area in the United States.

This study has an exclusionary delimitation associated with variables. It examines students as they complete course work in deved courses.

The choice of the DESP as the measurement tool was based on its long-standing validity and reliability over other measures of persistence (Lint, 2011).

Significance of Study

The significance of the present study can be presented in two ways. First, there is a significant gap in the research literature regarding the complex of deved, e-learning and student persistence. Until this research was proposed by the author, no original research existed with online instruction as the delivery method in deved. The tacit assumption in USHE has been that e-learning as a delivery method for deved students is an inherently incongruous proposition. Oblinger (2012) ventures that the acceptance of technology as a viable alternative to traditional, on-ground delivery is key to future growth in USHE. Applying and assessing e-learning instruction in deved courses can create a base of knowledge with the potential to drive future research.

Second, establishing data from this study will provide the following: (1) direct evidence of cost savings associated with college attendance and (2) predictive measures associated with student retention in online-based courses (Lint, 2011). In 2009, an estimated four billion dollars in federal, state, and local taxpayer monies in the form of appropriations, student grants and loans went to first-year, full-time, community college students enrolled in deved courses who did not return to study the following semester (Schneider & Yin, 2011). This critical loss of course time and money spent on non-college level courses can have a negative effect on students' future learning as well as on the public budget. Critical evidence of the possible influence of success in deved online courses upon student self-efficacy may support future policy changes of pedagogy in order to elicit best practices in deved student success (Allan & Seaman, 2014) and thereby in the success of college students more generally.

Summary and Transition

Questions on the nature of the direct or indirect effects of those factors that shape student persistence in online education are important for USHE (Allan & Seaman, 2014; NCES, 2012; Lint, 2011; Kember *et al.*, 1995, 1991). Identifying the relationships between variables such as student perceptions, performance, cost-benefit analysis, and student persistence and completion in this quantitative analytic study will create a base of data for students, policy makers, higher education leaders and administrators of institutions to make data-driven decisions pertaining to the potential value of online education being offered at low cost for all students. Providing responsive pedagogies increases achievement in college and improves the approaches currently being employed in the teaching and learning endeavor (Lint, 2011; Maltzman, 2008). Identifying best practices in fostering persistence and retention for students enrolled in deved courses offered via online learning is vital to creating an alternative college-readiness option in an affordable and convenient, student-centered format.

Chapter 2 includes a detailed and in-depth analysis of the literature related to the conceptualization, measurement, and development of the constructs of factors theorized to have direct or indirect effects on student persistence in e-learning. It expands on the identified gaps in the literature, revealing precisely how the current study addresses significant areas of research opportunity. Chapter 3 presents the research design and methods used to address the research questions, and pertinent issues related to data collection procedures, target population, sample demographics, and instrumentation. Chapter 4 presents the findings from this study. Chapter 5 is devoted to a discussion of the findings, summarization of all conclusions, limitations, implications for positive policy change, and recommendations for further research.

CHAPTER II: Literature Review

Introduction

Online learning is now established as a credible alternative for working adults seeking flexibility in education. These distance-based programs provide a means by which to reach more students and at more convenient locations and times than do traditional “brick and mortar,” ground-based programs (Allen & Seaman, 2014, 2008; Heyman, 2010; Field, 2009). One of the reasons online courses have become so popular is because of the many barriers that exist, in contrast, for students attending classes with campus-based schedules (NCES, 2012). However, there is continuous debate surrounding the credibility of student accomplishments and the seeming lack of persistence among those students who are enrolled in online learning at the college level, when compared to the traditional, on-ground student (Lei & Gupta, 2010).

Researchers have been testing the theorized correlation between persistence and distance education for over the past forty-five years (Kember *et al.*, 1995, 1991; Lint, 2011) and a number of theoretical models measuring student persistence in distance education have been developed. These models furthermore exhibit various methods of measuring reliability. Spady (1971), Tinto (1975), Bean and Metzner (1985), Kember (1995), Thompson (1999), Houle (2004), Harlow (2006), Porta-Merida (2009), and Lint (2011) have established research and advanced academic thinking and theory in this area. The combined results of their research can be considered mixed at best and these findings are dissimilar enough to muddy the waters with respect to identifying and validating factors that predict student persistence.

This quantitative analytic study builds upon the lineage of theoretical work developed over the past forty-five years that has been concerned with understanding factors that shape college student retention. However, during this span of time, several studies have shown only

partial support for hypotheses correlating the variables related to persistence in distance education (e.g., Lint, 2011; Porta Merida, 2009; Harlow, 2006; Houle, 2004; Thomson, 1999; Bean & Metzner, 1985), whereas others showed no statistically significant relationships (e.g., Woodley, de Lange, & Tanewski, 2001). The history of inconsistent findings has led scholars into debate over the value of the various theorized models of persistence in distance education (Woodley *et al.*, 2001) and has led them to question the validity of the DESP as a useful construct for prediction of student persistence (Lint, 2011).

Literature Search Strategy

This review involved the use of online library resources, local university libraries, document delivery services, and the direct websites of academic publishers and textbook resellers to secure older materials. Databases searched included the following: Academic Search Premier, ERIC, EBSCO Host and GOOGLE Scholar. Also consulted for dissertation manuscripts was the ProQuest Dissertation and Theses archive.

Key terms that fit the immediate subject matter domains were used to define the foundation of this literature review: all combinations and permutations of developmental education, remediation, persistence, and distance education were employed. The search for literature on the operational variables of interest began with 1989 for distance education, to affect intensity measure. This directed the focal point of the temporal search strategy for each construct respectively, with an emphasis on articles published within the last 10 years. This does not include historical reviews or searches related to theory for distance education and remediation, which were not filtered or limited by timeframe. I obtained and directly examined secondary source citations of importance located within any primary research articles.

With filters for database duplications, the search produced 6,334 results for persistence, 7,786 results for developmental education, and 129 sources with DESP and persistence combined. Further reducing the scope with a peer-review limiter, the more granular search of persistence yielded 55 results, followed by a manual selection of 41 articles of relevance. Only one study included both the DESP and the SOAP measures together (Lint, 2011). Detailed discussion of the selected peer-reviewed articles, dissertations, and other papers appears within the empirical review section of this chapter.

Student Persistence and Attrition

Theoretical Model

The theoretical model of student attrition was first developed by Spady (1971); the validity of the model was tested in 1970 and 1971 (Houle, 2004). Tinto (1975) modified the Spady (1971) model regarding what Tinto (1975) then began to term “dropout behavior” in his study of student integration models, placing added focus on the causal factor of social integration. Tinto’s (1975) model was the first to emphasize interaction of the student with influences from the student’s learning environment. Tinto’s (1975) model has been tested numerous times and validated in several academic studies (Brown, 2007; Cabrera, Nora & Castaneda, 1993).

Bean and Metzner (1985) argued that the Tinto model (1975), in its emphasis on social integration, is less relevant when used to evaluate interactions among students and between students and faculty in courses such as those in e-learning programs; they found that nontraditional students are more affected by life events (e.g. employment and family commitments) than by the social integration variables that influence student attrition. The work of Bean and Metzner (1985) was the first instance in which research conducted by Spady (1971)

and Tinto (1975) was combined. Their work also entailed an additional layer of measurement, external attribution, which had not been considered in previous research (Bean & Metzner, 1985).

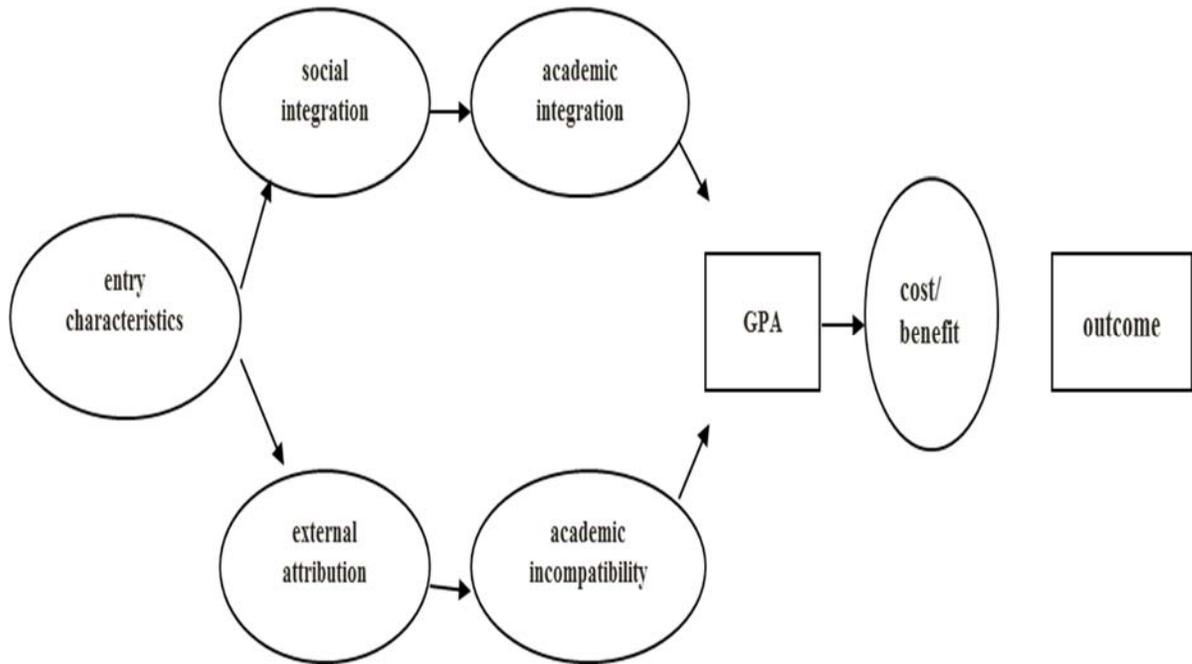


Figure 1 - Model of student progress (Kember, 1995)

The Kember (1989) model differentiates itself from that of Bean and Metzner (1985) in several areas, most noticeably in its concentration of research on the nontraditional student. Kember's model consists of two paths, referenced as the positive path and the negative path. Students on the positive path progress to the social integration stage of the model, which measures factors such as enrollment encouragement, study encouragement, and family environment. If students are on the positive path, they will progress to the academic integration stage of the model, which measures factors such as student approach to learning, motivation for taking the course, and positive course evaluation. Students on the negative path at the entry

characteristics stage progress to the external attribution stage of the model, which measures items such as insufficient time, unexpected life events, and personal distractions. Students who continue on the negative path advance to the academic incompatibility stage of the model. Students on either path then move on to a later stage at which students' grade performance and their analysis of the costs and benefits of continuing theoretically affect whether they will persist in coursework or not.

Kember's Modified Model

Kember (1995) included external attribution and academic incompatibility as harmful factors affecting student persistence in his modified model. The model for the present research builds on Kember's (1995) model. Thompson (1999) placed emphasis on sub-scales used in the DESP developed by Kember (1995) as an instrument that may indicate useful predictors of student attrition. Thompson (1999) used a dichotomous approach in defining continuing students and discontinuing students. Her research concluded that student withdrawal was positively connected with four sub-scales of the DESP: insufficient time, events obstructing study, negative impression of the course, and potential for withdrawal. Thompson's (1999) research concluded that the DESP Inventory created and utilized by Kember (1995) was reliable and predictive.

E-learning programs offer course instruction to meet a growing demand among both traditional and non-traditional learners throughout USHE who are in need of training, certifications and academic degrees (Allen & Seaman, 2013). Currently, interaction between instructors, students, and stakeholders via information technology has significantly enhanced e-learning. Emergent technological innovations and advancements currently allow instructors to relay information to students outside of the traditional "brick and mortar" environment in a format acceptable to student needs (Lei & Gupta, 2010). Although comprehensive support

services are offered to e-learners in some program models, students may have disappointing levels of success (Couturier, 2011; Cha & Patel, 2010; Nash, 2005). In this regard, this study tests Kember's (1995) student progress model by paying special consideration to external attribution as a factor affecting persistence and placing added emphasis on student preparedness and student support (Lint, 2011).

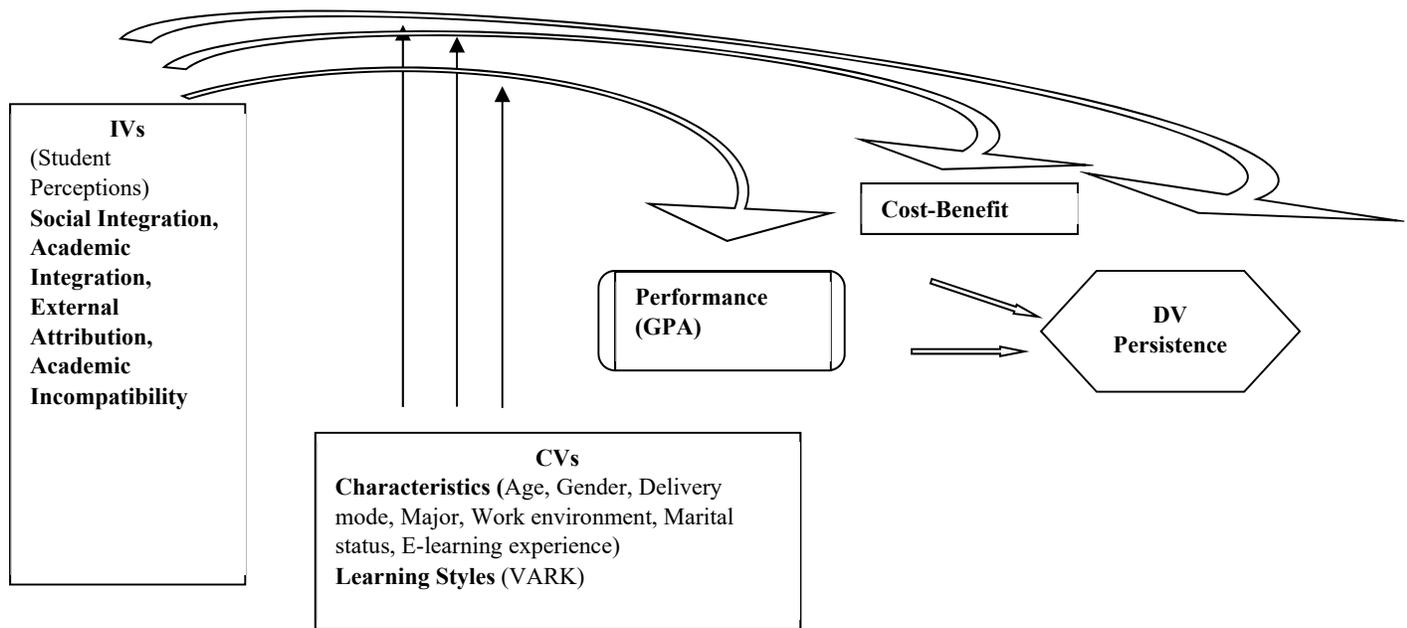


Figure 2. Lint Conceptual Framework (2011)

Financial Costs of Student Attrition

Financial costs associated with student attrition can be considerable to both the student and the institution (NCES, 2012; Simpson, 2004). The student suffers, paying for mandatory non-college-level courses and institutions lose valuable instruction time by allocating scarce resources to the delivery of developmental courses (Allan & Seaman, 2014). Kember identified that student performance and cost-benefit analysis directly influence student persistence and completion. Cost was not clearly demonstrated as an effective measurement tool in Kember's

(1995) model. To enhance the Kember (1995) model, this study includes an exploration of the association between student performance, cost-benefit analysis, and student persistence.

Although the Kember (1995) model is being tested, this study specifically tests it in the context of a self-directed and self-paced student learning format and program. In this study, self-directed learning is a process by which individuals take the initiative, with or without the assistance of others, in diagnosing their learning needs and formulating specific learning goals (Knowles, 1970). In self-paced student learning, the learner determines the pace and timing of content delivery (Grow, 1991).

Theories of Student Persistence and Retention

Initial theories of student persistence were developed in the time when the term “dropout” was used, rather un-artfully, to describe retention or the lack thereof. In this study, the term dropout has been replaced with persistence, representing the success of the student. Despite the variance and uncertainty surrounding the results of retention studies, some generalizations are possible (Nichols, 2010). E-learners are hypothesized to desist at an accelerated pace when compared to learners in traditional “brick and mortar” programs (Lint, 2011; Xu & Jaggars, 2011). The repeated validation and common acceptance of the Kember (1995) model has advanced understanding of student persistence in distance learning programs as the importance of social integration and external attribution are now widely recognized (Lint, 2011). The present research seeks to test this theory’s relevance to deved students.

Though the Kember (1995) model has been tested with different disciplines and academic levels, this will be the first attempt to apply this model to deved students in the e-learning environment. The Kember (1995) model predates the emergence of e-learning with its current, mass open access to teaching and course materials. In early studies, technological support and

the role of sources such as Khan Academy, Facebook, Twitter and multiple open-source instructional material for distance education were minimal to nonexistent. This study tracks, with analytics, the support offered to the student and records the preferred support means requested by, and the amount of support utilized by, the student. Lint (2011) describes measuring student retention as both complicated and confusing. The significant challenge here is the lack of previous research concerning student retention in deved online.

Cost-Benefit Analysis of Student Retention

Cost-benefit analysis in education is an important tool that can be used strategically on a macro level to drive policy but is also used implicitly by the student to quantify the perceived effectiveness and value of an academic program (Psacharopoulos & Patrinos, 2002). It is essential that research, especially that which might be conducted on the benefits of persistence in education, makes further progress that will enable cost-benefit analysis to become more useable as a factor in USHE. It is worthwhile to go through the discipline of noting the benefits and costs of a specific educational goal, even if social rates of return cannot be calculated robustly. Student attrition costs taxpayers, parents and students over four billion dollars each year in administrative costs and tuition (Schneider & Yin, 2011; Lint, 2011). According to the U.S. Department of Labor (2014), college degree attainment can increase yearly earnings by fifty percent in each year that an individual is involved in the workforce after degree attainment. These statistics establish the direct link exhibiting that student attainment of educational goals strongly determines the future earnings of that student in the workforce.

Deved programs are designed to prepare students for college-level course work and have been a controversial by-product of the open access at colleges and universities that began since the Commission on the Future of Higher Education (2005) issued a national call for greater

access of students to USHE. Less than twenty-six percent of “college track” high school graduates who take the ACT college assessment meet the benchmarks needed for these students to be considered college-ready (COE, 2013). According to the U.S. Department of Education, seventy-eight percent of all institutions of higher education offer some sort of remedial courses in an attempt to prepare enrolled students for college-level coursework.

Gap in Literature – College Readiness

The high number of underprepared college students translates into money spent on college-readiness courses (by both the traditional and adult student each year) that entail no direct advancement of the student toward a degree or certificate—that is, they receive no college credit for such coursework (NCES, 2012; Couturier, 2011). This means that, annually, thousands of students who are not college-ready are collectively spending millions of dollars and tens of thousands of hours on course material that will not count directly toward college completion. These statistics support other data that indicate that the vast majority of students taking college courses will require, at a minimum, one developmental course in order to complete a degree and obtain credentials needed for success within the 21st-century job market (ACT, 2014; U.S. Census, 2014).

When implemented effectively, deved tends toward a leveling of the playing field for students lacking academic preparedness, whether for traditional students or adult learners returning to school after an absence (Allen & Seaman, 2014). Deved administered effectively through e-learning formats may address socially problematic learning gaps as well as significant cost issues, both for the student and for society, and may prepare students for success in USHE in additional ways that serve to even the playing field for them vis-a-vis their better-prepared peers. Additionally, the Federal Student Aid and Fiscal Responsibility Act of 2009 proposes to

allocate twelve billion dollars to U.S. community colleges, with an emphasis on increasing the number of adults with two-year degrees by 5 million over the next 10 years (Moltz, 2010).

Ensuring that deved efforts are successful and identifying best practices in online delivery are both vital to institutions reaching this goal.

Problems with Kember's Model

Two significant problems with Kember *et al.* (1995, 1991, 1989) student progress model emerge from a review of the literature. First, the theory was created and conducted prior to the unprecedented proliferation of the internet as a delivery mechanism. Prior to the evolution of e-learning, distance education was limited to correspondence courses with instruction being issued through mail, television and audio/video tape (Kember, 1995). Understanding this, the author has modified the DESP in order to have the revised instrument correspond to and embrace modern equivalents and subject matter. Efforts have been made to remain as close to Kember's (1995) model as possible. For this research, Strevy's (2009) SOAP was added as an instrument that would provide a window onto the cost-benefit analyses in which students inevitably engage (Lint, 2011).

The second problem is Kember's peers' rebuttal, in scholarly publications, of his model. Walker (1995) has described Kember's presentation of the model as confusing and difficult to follow. Woodley *et al.* (2001) described Kember's model as having ambiguous and esoteric measures of progress and dropout. Their collective assessment argued that Kember's (1995) study, at a minimum, should be replicated for further evaluation. The application of Kember's (1995) model to a set of online deved courses will both re-test this model and create a new base of knowledge in online educational pedagogy.

History of the Student Retention and Persistence Model

Spady's Model

Spady (1971) first recognized the need for an “analytical-explanatory” approach to the study of student attrition. He articulated a desire to move toward an “interdisciplinary-based, theoretical synthesis of the most methodologically satisfactory findings and conceptually fruitful approaches to this problem” (p. 64). Spady proposed the first conceptual model of the attrition process based upon Durkheim’s (1997) model of the social nature of suicide. Durkheim (1997) had proposed that the desire to break ties to a social system developed from a lack of social integration between the individual and the larger society.

Spady (1970) hypothesized that the same process could be evidenced in a student’s decision to leave a particular institution of higher education. In Spady’s model, normative congruence (a student’s having similar levels of intrinsic and extrinsic motivation) affects other independent variables: grade performance, intellectual development, and support. These factors in this model influence the degree to which a student becomes socially integrated into the college. The assumption of the model is that there is a direct positive relationship between a student’s social integration and their satisfaction with their experience at the college. Spady’s work represented a significant step forward toward a comprehensive model of student attrition, but his work was considered to be more descriptive than predictive in nature (Lint, 2011).

Tinto's Model

Building upon the effort of Spady’s work is Tinto’s (1975) research, the model most commonly referenced in the area of student retention/dropout. It was first offered in a literature review (Tinto, 1975) and quickly gained the support of the academic research community. Tinto’s (1975) research became broadly consistent with a considerable range of other research,

as well as being a theoretical analogy to Durkheim's (1997) model of suicide. Tinto's (1975) student integration model of attrition was designed to be a longitudinal model that would explain the aspects and processes that influence a decision to leave higher education and how these processes interact to produce student attrition. Tinto (1975) proposed to accomplish several tasks. Firstly, he intended to differentiate between diverse reasons for student desistance. This is important, as his research offered a number of innovative approaches through which a student may choose to leave an institution.

In Durkheim's (1997) model of suicide, the individual is committing suicide due to an insufficient integration into society. Tinto (1975) asserts that dropout occurs because the individual is insufficiently integrated into different aspects of college or university life. Tinto identified the two most important systems at college as the academic and the social and contended that dropout could occur through a lack of integration into either or both of these systems. In addition, Tinto (1975) posited that extreme integration into either the academic or social system at college would be likely to cause problems with integration into the other system. Tinto's (1975) model of attrition was not based solely on Durkheim's (1997) model of suicide, as even Tinto acknowledged that Durkheim's model had one great drawback: its failure to take account of individual psychological characteristics that predispose some individuals to suicide.

Any model of dropout from higher education that was based solely on Durkheim's (1997) model would be subject to the same kind of shortcomings: it would fail to pay enough attention to the individual characteristics of a person that would make the student more likely, in comparison with his or her peers, to drop out of higher education. Tinto understood this and his work included assessing the degree to which individual characteristics affected attrition. Tinto (1975), in his examination, established the importance of social integration and academic

integration as crucial factors triggering student dropout or student persistence, thereby advancing previous research conducted by Spady (1971).

Summary and Transition

Kember et al. (1995, 1991) hypothesize that theoretical frameworks for distance education are important because social and academic interaction have a direct effect on teaching and learning, influencing student persistence and course performance. Kember et al. (1995, 1991) progressively develop a theory of measurement and a model of progress for the evolved nontraditional student by noting the positive aspects of social integration and academic integration and the negative aspects of external attribution and academic incompatibility as key indicators of persistence or desistance.

A review of the literature exposes an extensive gap in data-based knowledge regarding deved delivered through an e-learning platform. Establishing predictive knowledge of student persistence is paramount to creating best practices in teaching and learning. Understanding this, advancing e-learning, and establishing a base of knowledge and data that will better support the learning needs of both traditional and non-traditional students are critical prerequisites for increasing retention and completion rates (Allan & Seaman, 2014; Harris, 2010).

What is now called for is a comprehensive study that supports the establishment of a research base for further study of deved courses delivered exclusively online. The data generated from this study will provide an understanding of persistence in online courses for a massive subgroup in USHE for which no data currently exists.

CHAPTER III: Methodology

Introduction

The purpose of this quantitative analytic study is to evaluate and test Kember's (1995) student progress model, which examines the direct or indirect effects of several factors on student persistence in online courses. Specifically, this study tests the value of Kember's (1995) model with a core of developmental education (deved) e-learning courses. The study's methodology is set forth in this chapter through the following sections: (a) research design and rationale, (b) methodology, (c) population, (d) sampling and sampling procedures, (e) recruitment procedures, (f) instrumentation and operationalization of constructs, (g) data analysis plan, including research questions and hypotheses, (h) threats to validity, and (i) ethical procedures.

Research Design and Rationale

Independent variables for the study include (a) social integration, (b) academic integration, (c) external attributions, and (d) academic incompatibility (Kember, 1995). Student performance will be used as a mediator variable to determine whether it has a direct or indirect impact on student persistence. Cost-benefit analysis is another mediator variable used to determine whether it has a direct or indirect influence on student persistence. The dependent variable is student persistence, to be measured by the DESP/SOAP Survey (Kember, 1995; Lint, 2011). Based on the nature of the research inquiry, this research has employed a modern design, updating questions to reflect appropriately the evolution of distance students into online students. Previous research, most recently conducted by Lint (2011), exhibits some form of modification

to the original Kember (1997) model. This conduct is consistent with established protocol and permissible under the copyright clearance received from Kember (Appendix C).

The original DESP Inventory (1994, 1995) was modified from 68 into 64 items by eliminating items not relevant for students from the USA. Kember (1995) acknowledged that initial demographic questions and the wording of some items in the instrument may have to be modified. The research questions and hypotheses in this study address a gap in the literature on persistence in e-learning courses by investigating the process and experience of an online sample of students engaged in developmental education course work (Allan & Seaman, 2014; Couturier, 2011).

Methodology

Target Population

The target population for this study was students who had been administered, by their postsecondary institution, the College Placement Test (COMPASS)—a computer adaptive test that helps in appropriate assignment of students to courses according to their abilities (ACT, 2014)—and who, as a consequence of their COMPASS assessment, had been mandated by their institution to enroll in at least one deved course at a community college in Illinois. Through recommendations from COMPASS testing staff, students were referred to an online deved suite of courses offered by the Catalyst Educational Research Center (CERC) that included the following: English 095, English 099, Math 095, Math 099, Reading Comprehension 095 and Reading Comprehension 099 courses.

Sample and Sampling Procedures

Though registration was open to all students, the referring parties at the community college were asked to generally refer to the study those individuals who were non-traditional students over the age of twenty-one. According to NCES (2012), data indicate that seventy-three percent of all enrolled college students had at least one of the characteristics that would classify them as non-traditional and fifty-six percent had two or more of these characteristics. After agreeing to participate in the study, students were given the option of enrolling, at no charge, in any one or more of the six deved courses which were offered exclusively online by CERC, or alternatively they could have chosen to enroll in traditional, “brick and mortar” courses at any community college at the standard tuition rate.

Participants for this research were recruited by being invited to leave a notification of availability with Testing Center staff at four Illinois community colleges on July 28, 2014. Prospective participants were invited to do so by these staff through word-of-mouth. As participants in the study, students agreed to: a) consent to participate in the research project; b) submit COMPASS scores from before and after having participated in the study; c) complete three surveys as prompted; and d) cooperate in longitudinal research after course completion.

The deved courses examined in this study were developed and administered by the Catalyst Educational Research Center, Inc. (CERC), a not-for-profit educational research organization located in Chicago, Illinois. The six courses were offered free of charge to 520 students concurrently enrolled in community college classes in Illinois. Curricula for the courses were developed according to guidelines issued by the Illinois Community College Board for deved courses and involved a progressive, modular format. Students attended courses online from August 4, 2014 through December 22, 2014. Academic support for students enrolled in the

six courses was provided by CERC personnel using email, chat, Skype and social media sites. Students were also directed to make skillful use of collaborative, open-sourced instructional resources.

Data were collected by from full-time and part-time students. All qualified participants had to speak English as their primary language. This criterion was especially pertinent for completing the DESP/SOAP, as the validation process was based on North American data and native English speakers (Wallen & Fraenkel, 2001). Each participating student was asked to complete a sixty-four-question survey (DESP/SOAP). Each participant was screened for qualifications based on the purposive sampling frame described in the next section and the completion of a consent and confidentiality form per standard protocol. The study was based on a nonprobability (convenience) sample. Convenience sampling is common and often a necessary method of recruiting participants (Creswell, 2008; Wallen & Fraenkel, 2001) and is scientifically “reasonable and worthwhile” for assessing human behavior using descriptive statistics (Newton & Rudestam, 1999, p. 121).

Students who responded to the invitation and the consent were surveyed. Students’ privacy was carefully protected and each student’s name, affiliated college, and identification were masked as each student received identification based on random numbers ranging from 1501-2020. The online survey was administered via a virtual platform. The data were logged and respondents who did not meet the criteria for the study were removed for consistency and accuracy. The dataset was exported to Microsoft Excel and filtered to ensure a good fit against the defined research questions. The refined dataset was then imported into a Statistical Package for the Social Science (SPSS) 23.0 database to allow calculation of the mean and standard deviation for each variable and to create correlation matrices.

A survey comprised of three sections (Appendix A) was used as an instrument to answer the research questions in order to support definition of the hypotheses in this study. In section I, variables of age, gender, reason for return to school, work environment, marital status, e-learning experience, and learning styles (items 1-9) were explored. Student Performance (GPA, item 10), Cost-Benefit analysis (items 11-13, 15), and Student Persistence (items 14 and 16) were investigated in Section II. The intent to withdraw or to not continue enrollment in the next semester (item 16) was used to measure the reliability of the negative aspect of student persistence. Section III of the survey used the DESP inventory.

Procedures for Recruitment, Participation, and Data Collection

Recruitment

Students who were enrolled concurrently in courses at an Illinois community college and who also were determined by COMPASS to require developmental education courses were invited to participate in this study. All referred students had an equal opportunity to participate in the study as long as they met the sampling frame criteria and had online access, including an email account, in order to be able to complete the course and survey instruments successfully.

Participation

Each participant submitted their consent for study inclusion via the instructional survey. The letter inviting participants to consent appears in the appendix (Appendix A). Each participant received a description of the study as well as instructions for participation and completion of the study. The participants were not required to engage in any exit procedures and could exit the study at any point in time.

Demographic Data

In section I, variables including age, gender, reason for return to school, work environment, marital status, e-learning experience, and learning styles (items 1-9) were explored. Post hoc analyses were conducted to assess statistically significant differences (if any) on the dependent variable with respect to participant demographic characteristics.

Data Collection

All data were collected online through two log-in portals. The first log-in portal provided the (a) description of the study, (b) participation instructions, (c) demographic questions (see Appendix B), and (d) DESP/SOAP (self-report version; 64 questions from the instrument will be analyzed for this study). The second log-in portal enabled participants to complete the DESP/SOAP. All scores and results will be held strictly confidential, and no individual data will be shared with any organization or with other persons. Each instrument (DESP, SOAP) is valid and reliable, thus a pilot study was not deemed necessary. However, a brief test was conducted for the purposes of identifying user-based problems, including a test of log-in procedures and of the exportation of raw data. Raw data are stored on a laptop computer with external drive back-up. All online data access is guarded by encryption and secure passwords, with software firewall protection.

Instrumentation and Operationalization of Constructs

Comprised of three sections (Appendix A), the survey was used as an instrument to answer research questions and to define stated hypotheses of the study. In Section I, Student Characteristics, variables of age, race, gender, reason for return to school, work environment, marital status, e-learning experience, and learning styles (items 1-9) were explored. Section II included elements of Strevy's SOAP instrument: Student Performance (item 10) as course GPA, measures of Cost-Benefit analysis (items 11-13, 15), and Student Persistence (items 14, and 16), which will measure intent to persist. Intent to desist or not to persist in enrollment (item 16) was employed to measure the reliability of the negative aspect of student persistence. Section III of the survey will then use the DESP inventory, which contains Kember's four factors of social integration, academic integration, external attribution, and academic incompatibility.

The independent variables (social integration, academic integration, external attribution, and academic incompatibility) and dependent variable (persistence in online learning) were measured using standardized instruments that have been shown to be valid and reliable for measuring their respective constructs (e.g., Lint, 2011; Porta-Merida, 2009; Harlow, 2006; Houle, 2004; Thomson, 1999; Bean & Metzner, 1985). Permissions required for each instrument have been obtained (see Appendix C).

Distance Education Student Progress (DESP)

Section III of the survey employs the DESP inventory, which was created, developed and first utilized by Kember et al. (1991) as an instrument to identify factors of student persistence or desistance. It is central to the student progress model. The DESP inventory has been tested in previous research and has been deemed by several scholars to be an efficient tool for defining student persistence in distance education. The original DESP Inventory (1991) consists of 68 items. The DESP inventory used in this study was modified into 64 items by eliminating elements not relevant for students enrolled for study in e-learning courses.

Section III of the survey asks students to respond to items using a 5-point Likert scale (1=Strongly Disagree, 2=Disagree, 3= Neither, 4=Agree, and 5=Strongly Agree) as Kember et al. (1994, 1995) proposed. Items marked with an asterisk (*) were administered in reverse order from that of the original survey, a technique used to test the reliability of a questionnaire (Houle, 2004). Permission to use the DESP inventory was purchased from the Copyright Clearance Center, the manager of copyright clearance for Kember's intellectual work in the United States (Appendix C).

Reliability and Validity (DESP)

In Section III of the survey, the Distance Education Student Progress (DESP) inventory, which delves into the four factors of social integration, academic integration, external attribution, and academic incompatibility, is utilized as an instrument. The Distance Education Student Progress (DESP) inventory was developed and used by Kember *et al.* (1991, 1994, 1995) as an instrument to find the factors of student persistence or dropout that were the foundation of the student progress model. The DESP inventory has been proven by several scholars to be an efficient tool for defining student persistence in distance education. The original DESP Inventory (1994, 1995) consists of 68 items, but the DESP inventory used in this study was modified into 64 items by eliminating elements not relevant for students from the USA. Kember (1995) acknowledged that initial demographic questions and the wording of some items in the instrument may have to be modified. The four scales of social integration, academic integration, external attribution, and academic incompatibility encompass 14 subscales.

Items between 1 and 11 measure social integration with three subscales: enrollment encouragement (items 1-4), study encouragement (items 5-8), and family support (item 9-11). External attribution was measured by items 12-28 with four subscales: insufficient time (items 12-15), events hinder study (items 16-18), distractions (items 19-25), and potential dropout (items 26-28). Academic integration was measured with items 29 to 48, covering five subscales: deep approach (items 29-32), intrinsic motivation (items 33-36), positive course evaluation (items 37-41), positive support (items 42-45), and study habit (items 46-48). Finally, academic incompatibility was measured by items 49-64, including three subscales: surface approach (items 49-54), extrinsic motivation (items 55-58), and negative evaluation (items 59-64).

In Section III of the survey, the DESP Inventory, students were asked to respond to items using a 5-point Likert scale (1=Strongly Disagree, 2=Disagree, 3= Neither, 4=Agree, and 5=Strongly Agree) as Kember et al. (1995, 1994) had suggested, but in reverse order. The starting point on the scale, number 1, was switched from Strongly Disagree to Strongly Agree for students' convenience. The asterisked (*) items in the survey are in reverse order from their form in the original DESP, which is a technique used to test the reliability of questionnaire items (Houle, 2004). Permission to use the DESP inventory was obtained from the Copyright Clearance Center (Appendix C).

Reliability: The Cronbach Alpha Coefficient indicates the significant extent of the reliability. A coefficient of 0.70 or higher is considered high enough to verify the reliability of the instrument (Cronbach, 1951). Cronbach α values for reliabilities are given for the original research conducted by Kember, Lai, Murphy, Siaw, & Yuen (1992) and for the revised versions of the instrument (Kember et al., 1994). The revised version (1994) has higher reliabilities. Significant standardized regression coefficients between variables were identified (Kember et al., 1994). The Kember et al. (1994) study reported the reliabilities of the modeled components by using factor analysis: social integration, 0.68; external attribution, 0.61; academic integration, 0.65; and academic incompatibility, 0.55.

The replication study (Lint 2011; Kember et al., 1994) of the DESP Inventory identified higher reliability coefficients by using path analysis: the social integration component, 0.69; external attribution, 0.77; academic integration, 0.80; and academic incompatibility, 0.76 (Porta-Merida, 2009).

Validity: Thompson (1999) examined the sub-scales and scales developed from the DESP inventory that are associated with attrition and persistence from 258 fourth-year students

of an education course at an Australian university. In this study, seventy-two questions with subscales were used to determine if the DESP inventory is an effective instrument for determining reasons for student attrition and persistence. The first four factors were identified as correctly predicting 64 percent of students' withdrawing and students' continuing. According to the reported result, 67.5 percent of students were correctly classified as using insufficient time as a reason, because it was the subscale with the highest correlation. Thompson (1999) also determined that the DESP inventory was useful in developing a model for persistence when the outcome variables were defined as either GPA or the number of course modules failed.

Houle (2004) conducted a quantitative study of adult student retention in online-based education. The final study population consisted of 212 of 308 students at a college in New York. The results of the study indicated that paths among student progress factors were statistically significant. Houle (2004) modified the student progress model to improve accuracy of prediction. The result revealed that cumulative GPA had a statistically significant influence on students' course persistence.

Harlow (2006) conducted a study utilizing the DESP and the Motivated Strategies for Learning Questionnaire (MSLQ) by comparing 64 online students and 120 face-to-face seminary students taking Greek or Hebrew. Harlow (2006) reported that social integration was shown not to be a factor influencing course persistence. Strevy (2009) found that cost-benefit appraisal positively correlated at near .30 or higher with students' intent to persist.

Porta-Merida (2009) conducted a survey with 877 participants out of 1100 students in a private, medium-size university in Florida. Porta-Merida (2009) discovered three implications showing that there is a correlation between student performance (GPA) and student retention. According to the three research questions of the study, students who withdrew from school

showed a tendency to agree less with the social integration questions and had a lower cumulative GPA. The second impact of student retention is academic incompatibility and it confirms a low but significant positive correlation. Lastly, the third implication affirms a statistically significant difference between the means of dropout students and persistent students on the external attribution subscale. The result of the study points out that social integration and academic incompatibility are important predictors in student retention and that academic incompatibility plays an important role in the GPA for dropout students.

Student Online Academic Persistence (SOAP) inventory

Section II of the survey employs items 22, 23, 24, and 25 of Strevy's (2009) Student Online Academic Persistence (SOAP) for the cost-benefit analysis and item 40 of the SOAP for student persistence. Cost-Benefit Analysis (items 11-13 and 15 of section II) and modified Student Persistence (items 14 and 16 of section II) measure intent to persist and extent of intent to not persist. Permission to use the SOAP inventory items was requested of Strevy, who is the creator and developer of the SOAP (Appendix D). The validity and reliability of the SOAP survey was verified by Strevy in two studies (2009). Permission to use the SOAP inventory items was granted by Dr. Strevy.

Reliability and Validity (SOAP)

Student Online Academic Persistence (SOAP) survey includes the items for cost-benefit analysis and student persistence that were developed by Strevy (2009). The validity and reliability of the SOAP survey were verified by two of Strevy studies (2009). Cronbach alphas of the cost-benefit appraisal and intent to persist scales are .84 and .68, respectively (Strevy, 2009).

Data Analysis Plan

Software used for analyses

Calculations for descriptive statistics were conducted using IBM SPSS 23 (Norušis, 2011). All assessments and tests will be conducted via the Internet, with compatibility for all major browser software platforms (Internet Explorer, Firefox, Chrome, etc.). Data were downloaded as *.csv files and exported into SPSS. Technical support for online questionnaires/tests was provided within each secure assessment portal respectively, and researcher contact information was supplied to each participant by email if questions or additional assistance was required.

Data Screening

All data were screened for outliers prior to analysis. Data were then examined to determine if any missing data were missing at random, using MCAR (IBM-SPSS, 2011). More specifically, Little's MCAR test was conducted to determine whether the pattern of missing data was such that it was missing completely at random (MCAR). Further, comparisons between the respondents with missing values and the respondents without missing values on the key study variables were completed to determine if significant differences between the two groups existed. The range for all variables was examined to ensure that there were no mis-keyed entries or values out of range.

Research Questions and Hypotheses

This study investigates the linkage between, on the one hand, theory, and on the other hand, the self-reported student perspective, with respect to issues of student persistence in e-learning. To accomplish this, the study highlights predictive factors by testing the Kember (1995) student progress model with regard to influence on persistence in e-learning courses. The main theoretical support of this study is based on the model of student progress proposed by Kember (1995). The study engages three null hypotheses and three alternative hypotheses based on three primary research questions.

RQ1

Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, d) academic incompatibility and student persistence? Does the relationship vary in statistical significance with respect to student characteristics and learning style?

Hypothesis 1: That a statistically significant relationship will be found between student perceptions and student persistence.

RQ2

Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, d) academic incompatibility and student persistence as mediated by student performance (defined by GPA)?

Hypothesis 2: That student performance (GPA) will be found to have a statistically significant mediating role on the relationship between student perceptions and student persistence.

RQ3

Is there a statistically significant relationship between student perceptions of: a) social integration, b) academic integration, c) external attribution, and d) academic incompatibility and student persistence as mediated by cost-benefit analysis?

Hypothesis 3: That student cost-benefit analysis will be found to have a statistically significant mediating role on the relationship between student perceptions and student persistence.

Threats to Validity

An important threat to external validity in this study relates to the use of a convenience sample (Creswell, 2008). In any convenience sampling design, including purposive sampling, the ability of the researcher to generalize findings is limited, as it is more difficult to rule out confounding and extraneous variables when random assignment is not used. Individuals who voluntarily took the time to participate in a study may differ from the general target population of deved students in substantive ways. For example, they may have a higher commitment to completion of the online courses than the general student population.

The type of applied research conducted on persistence in online education routinely requires data collection from individual students as opposed to closed university lab settings. Applied research must be conducted in a way that is both equitable and ethical, in which each student has equal and voluntary access to participate and to receive the potential benefits of course work access. Equal access to benefits, as well as voluntary, confidential participation have been identified as critical requisites of ethical research, even though it may lead to fewer opportunities to use control group designs (Creswell, 2008).

One of the important outcomes offered in this study is the assessment of how feeling/emotions (as a measure of persistence) may be used in future studies of online learning in

USHE, measuring typical performance data, and thus providing superior predictive correlations between online learning pedagogy and a wide range of outcome variables. The best way to combat problems of internal and external validity related to selection and population is through careful monitoring of group demographic differences for multicollinearity, specifically in the analysis of residuals, using post hoc analysis testing (Newton & Rudestam, 1999).

Ethical Procedures

Recruitment of participants was voluntary, based on open participation, and was offered equitably to all students. Participation could end at any time at the discretion of the participant. Although data collection was not anonymous, all collected data and report documents were held in strictest confidence. No personal information, data report files, or individually identifiable data were shared with any entities (e.g., student's current school). The data collection stage lasted one week from initial invitation to close. Two additional data collection requests were sent to all participants who had persisted through predetermined cycles of study. All raw data collected were securely stored in the manner described in the data collection section of this chapter, and will be held for 5 years unless specified otherwise by the Catalyst Educational Research Center, Inc.

Summary

This section described the design methodology used for this study to test the linkage between theory, on the one hand, and on the other hand the self-reported student perspective, with respect to issues of student persistence in e-learning. The findings from this study will be provided in Chapter 4 and discussed in detail in the final chapter, offering useful social change recommendations regarding the continual improvement of online learning.

In a previous section, an introduction to the proposed research was presented. This included a description of the research problem, purpose and hypotheses that served to direct the data analysis and an identification of several terms key to the study. In addition, a review of literature relevant to the variables—the literature on e-learning, student persistence, social integration, external attribution and academic integration—established contextual support for the study. The variables have been previously studied extensively, but not in a format designed for the instruction of deved courses. The proposed research is an effort to examine the relationships between these variables in a manner that has not been accomplished to date, and will establish a base of knowledge in e-learning, deved, social integration and persistence.

According to Creswell (2008), the methodology section should outline specific steps that enable the logical creation of a study. The goal of this study is to first answer the three research questions as posed. Additionally, the study will investigate data from online deved courses and the influences of the following: social integration, academic integration, external attribution, and academic incompatibility for students enrolled in these e-learning deved courses. Creswell (2008) posits that implicit philosophical ideas directly influence the practice of research and need to be identified. This research exercises a post-positivist view and is reflective of the need to identify and assess causes that influence student outcomes (Creswell, 2008). The post-positivist theory assists in establishing the plausibility of a theoretical model by estimating the degree to which various explanatory variables influence the dependent variable (Cooley, 1978).

This study is not intended to generalize e-learning or deved. Data collected will be important in establishing a base of information currently non-existent in USHE by investigating the application of an e-learning delivery model to deved courses. Future research will add to this data, testing its validity, expanding on the research and exploiting the understanding it provides,

perhaps eventually leading to the creation of best practices in the pedagogy of deved e-learning that will be associated with this rapidly growing field.

CHAPTER IV: Results

Introduction

This quantitative analytic study was conducted to contribute new information about Kember's (1995) student progress model. To accomplish this, the research discussed here examines factors having direct or indirect effects on student persistence in e-learning developed courses. This chapter presents findings concerning the hypotheses associated with three research questions (RQs): (RQ1) Is there a statistically significant relationship between, on the one hand, student perceptions of: a) social integration, b) academic integration, c) external attribution, and d) academic incompatibility, and on the other hand, student persistence? (Does this relationship vary in statistical significance with respect to student characteristics and learning style?) Is there a statistically significant relationship between, on the one hand, student perceptions of: a) social integration, b) academic integration, c) external attribution, and d) academic incompatibility, and on the other hand, student persistence as mediated by GPA (RQ2) and cost-benefit analysis (RQ3)?

This chapter begins with a discussion of the data collection process, data analysis, demographics, and assessment of the sample. Next are the findings of the study, including descriptive statistics on the predictor and outcome variables, tests of the hypotheses through correlation and hierarchical regression, and follow-up analyses. Tables of the results, which support the data presentation's clarity and efficiency, are also included where appropriate (American Psychological Association, 2010).

Data Collection

Data for this research came from a pilot project sponsored by CERC that was aimed at improving readiness for college-level work among a sample of 520 individuals concurrently

enrolled in Illinois community colleges who were invited, and consequently volunteered, to participate in the project. From the pool of invitees, 520 (100% response rate) provided informed consent. CERC collected the data using self-administered online surveys, the DESP (Kember et al., 1995) and the SOAP (Strevy, 2009), which participants completed over a period of two weeks. Among the participants, 520 (100%) successfully completed the surveys. Psychometric properties for each instrument were provided and discussed in the Chapter 3 section, Instrumentation and Operationalization of the Constructs. Data for this study were later obtained from CERC in a Microsoft Excel format and subsequently imported into and analyzed using the Statistical Package for Social Services, v23.0 software program (Norušis, 2011).

Prior to the launch of this study, CERC had developed a suite of online modules in math and English-language skills designed to prepare students for college-level courses. This suite of modules had been designed to allow participants to progress in stages, at their own pace, with ample opportunities for feedback and assistance along the way. In addition, participants were shown how to access various types of free learning resources available on the internet, such as the Khan Academy. Upon completion of the suite of modules, CERC had encouraged participants to take the ACT COMPASS placement test offered at their local community college.

The survey was comprised of three sections (Appendix A of Lint, 2011) and was used as an instrument to answer the research questions. In Section I, variables of gender, race/ethnicity, age, college-type affiliation, reason for return to school, work environment, marital status, e-learning experience, and learning styles (items 1-9) were explored. Student Performance measured as GPA (item 10), Cost-Benefit analysis (items 11-13, 15), and Student Persistence as measured by intent to continue enrollment in online courses (items 14 & Ad.14) and by extent of intent to withdraw or to not continue enrollment in online courses during the next semester (item

16) were investigated in Section II. The intent to withdraw or not to continue enrollment in the next semester was used to measure the reliability of the negative aspect of student persistence. Section III of the survey used the DESP inventory.

Preliminary Data Analyses

Variables

The examined variables in this study are listed below:

Independent Variables

- Social integration, Academic integration, External attributions, and Academic incompatibility

Mediator Variables and Covariates

- Mediator variables: Student Performance and Cost-Benefit Analysis
- Student Performance was measured by cumulative GPA.
- Cost-Benefit Analysis was measured by the survey questions.
- Covariate: Student Characteristics and Student Learning Styles
- Student Characteristics: Gender, Race/Ethnicity, Age, College affiliation, Reason for return to school, Work environment, Relationship status, and Prior online experience
- Student Learning Styles: Visual learners, auditory learners, reading/writing learners, and kinesthetic learners

Dependent Variable

Student Persistence was measured by the following two items: intent to continue enrollment in online coursework the next semester (Q14 and Ad.Q14), *extent* of intent to not

continue enrollment in online coursework the next semester (Q16). The following three analytic reports were presented to identify and answer the research questions and hypotheses: (1) Descriptive statistics (2) Bivariate analysis, and (3) Multivariate analysis.

Table 1*Research Questions, Variables, and Statistical Analysis*

Research Questions	IVs/CVs/MVs	DV	Statistics
RQ1 - Is there a statistically significant relationship between student perceptions of the academic experience of (a) social integration (b) academic integration (c) external attribution, and (d) academic incompatibility and student persistence (within the online learning environment at the community college level)? Does the relationship statistically significantly vary with respect to student characteristics and learning style?	Student Perceptions: (social integration, academic integration, external attribution, academic incompatibility) Covariate: Characteristics (age, gender, work environment, reason for return, marital status, online experience); Learning Styles	Student Persistence	Descriptive statistics Logistic regression Multiple regression
RQ2 - Is there a statistically significant relationship between student perceptions of the academic experience of (a) social integration (b) academic integration (c) external attribution, and (d) academic incompatibility and student persistence, mediated by student performance (GPA)?	Student Perceptions: (social integration, academic integration, external attribution, academic incompatibility) Mediator: Student Performance (measured by GPA)	Student Persistence	Descriptive statistics Logistic regression Multiple regression
RQ3 - Is there a statistically significant relationship between student perceptions of the academic experience of (a) social integration (b) academic integration (c) external attribution, and (d) academic incompatibility and student persistence, mediated by cost-benefits?	Student Perceptions: (social integration, academic integration, external attribution, academic incompatibility) Mediator: Cost-Benefit	Student Persistence	Descriptive statistics Logistic regression Multiple regression

Descriptive Statistics

Demographics

This study used descriptive statistics to build a basic profile of the Student Characteristic items in Section I as well as of the dependent variables. The study then applied a logistic regression and multiple regression analysis to examine the direct and indirect causal effect, or non-existent effect, among variables. Logistic regression analysis was applied for categorical data of the dependent variables. Q14 and Ad.Q14 of Section II produced dichotomous data; thus, they were analyzed by applying logistic regression.

All 520 eligible students participating in this study were concurrently attending public community colleges in Illinois and were invited to enroll in courses for the Fall Semester of 2014. The return rate was one hundred percent (100%) of students enrolled. Of the enrolled 520 students, 520 (100%) participated in the survey. As displayed in Table 2, the majority of the sample was female (61.9%) while male participation was 38.1%. The vast majority of students participating in this survey were 23 years of age and older (83.8%). Single (33.5%) was the largest category for relationship status. Married (29.0%) was a close second, followed by Steady Relationship (21.2%) and Divorced/Separated (16.3%). Over half of the participants (50.4%) indicated their race as white. The largest minority group participation was among African Americans (36.0%), followed by Hispanics (9.6%), multiple race (2.7%) and other (1.3%). All students participating in this study were considered adult or non-traditional students, as defined earlier.

Table 2*Student Demographical Characteristics*

		Frequency (N)	Valid Percent (%)
Gender	Male	198	38.1
	Female	322	61.9
Age	18-22	84	16.2
	23 and older	436	83.8
Marital Status	Single	174	33.5
	Married	151	29.0
	Steady Relationship	110	21.2
	Divorced/Separated	85	16.3
Race / Ethnicity	White	262	50.4
	African American	187	36.0
	Hispanic	50	9.6
	Multiple Races	14	2.7
	Other	7	1.3

Note. N = numbers. Valid percent: removed the missing values and calculated the valid percent on the numbers of respondents who actually answered.

Descriptive statistics of additional student characteristics (i.e., student educational impetus, prior online course experience, work environment and learning styles) appear in Tables 3 and 4. All students involved in this sample were taking online classes as part of the study. All participants answered the question pertaining to reason for return to school. The participant responses were as follows: Workforce Development = 47.1% (245), Academic Degree = 15.2% (79), and 37.7% (196) indicated returning to school in order to work toward a specific certificate program that would lead to employment. There were 520 participants who answered the question pertaining to previous online course experience. As shown in Table 3, only 22.9% (119) had previous online course experience, with 77.1% (401) indicating no previous online learning. The mean was 1.23 (where 1=No and 2=Yes) and the SD was 0.420.

Table 3*Student Educational Background*

	Frequency (N)	Valid Percent (%)
Reason for Return to School		
Workforce Development	245	47.1
Academic Degree	79	15.2
Certificate Program	196	37.7
Previous Online Experience		
Yes	119	22.9
No	401	77.1

Note. N = numbers. Valid percent: removed the missing values and calculated the valid percent on the numbers of respondents who actually answered.

Represented in Table 4 is data submitted by 520 participants who answered the questions pertaining to their work environment and preferred learning style. Data on participants' current work environment were as follows: Full-Time = 24.6% (128), Part-Time = 39.0% (203), and Unemployed = 36.4% (189). There were also 520 participants who answered the question pertaining to learning style, according to the following breakdown: Visual = 15.0% (78); Auditory = 55.4% (288); Reading/Writing = 23.5% (122); Kinesthetic = 6.2% (32). Auditory and reading/writing learners comprised almost 80% of the participants. Visual and kinesthetic were the least populated categories.

Table 4

Student Work Environment and Learning Styles

	Frequency (N)	Valid Percent (%)
Work Environment		
Full-time	128	24.6
Part-time	203	39.0
Unemployed	189	36.4
Learning Style		
Visual	78	15.0
Auditory	288	55.4
Reading/Writing	122	23.5
Kinesthetic	32	6.2

Note. N = numbers of valid percent

Fundamental Statistical Assessment of the Sample

Exhibited in Tables 5, 6, and 7 are the study’s three main scores of student persistence. Data were reported that employed different measurements of persistence in this study. In this research, Q14 was identified as the dichotomous variable of a participant’s intent to enroll in online courses the next semester. A redefined, Ad.Q14, became necessary as well, as described below. The final persistence item, Q16, was collected as a continuous measure of *extent* of intent to enroll in online courses next semester.

A total of 520 participants answered item Q14, with the following responses: No = 23.7% (123); Yes = 76.3% (397). A total of 520 participants also answered Q16b, a question pertaining to the main reason for withdrawal from a continuation of online learning in the next semester, with the following responses: Transfer = 10.2% (53); Graduation = 3.5% (18); Unsatisfactory = 30.4% (158); Academic Failure = 33.3% (173); Financial Issues = 22.6% (118).

Table 5*Dichotomous Variable of Student Persistence (Q14) and Main Reason to Withdraw (Q16b)*

	Frequency (N)	Valid Percent (%)
Intent to enroll		
Yes	397	76.3
No	123	23.7
Main reason to withdraw		
Transfer	53	10.2
Graduation	18	3.5
Unsatisfactory	158	30.4
Academic failure	173	33.3
Financial issues	118	22.6

Note. N = numbers. Valid percent: removed the missing values and calculated the valid percent on the numbers of respondents who actually answered.

It was discovered that an adjustment needed to be made to the coding of participant responses to Q14, the item measuring intent to enroll in online courses next semester, in light of the responses some participants had given to Q16b. Displayed in Table 6 are the recoded responses for the adjusted dichotomous variable (Ad.Q14) that was developed. Among the participants who had answered “No” for the item about intent to enroll in online courses next semester (Q14), those participants who had also answered Q16b with “Transfer (to another institution)” or “Graduation” were adjusted as “Yes”. Those adjusted from “No” to “Yes” comprised 21 participants. The final responses are as follows: Yes = 80.4% (418); No = 19.6% (102).

Table 6*Adjusted Dichotomous Variable of Student Persistence (Ad.Q14)*

	Frequency (N)	Valid Percent (%)
(Adjusted) Intent to enroll		
Yes	418	80.4
No	102	19.6

Note. N = numbers. Valid percent: removed the missing values and calculated the valid percent on the numbers of respondents who actually answered.

The extent of intent to enroll in online courses next semester (Q16) is presented in Table 7. A total of 520 answered the question. The mean score for participants was 3.77 and the SD was 1.254. When the extent of intent to enroll (Q16), actually a measure of the extent of intent to *withdraw*, was correlated with the intent to enroll (Q14), the Pearson coefficient for the two items was .093 with a significance of .03. This indicates that the items for intent to enroll and extent of intent to enroll/withdraw in online courses next semester have moderate internal consistency.

Table 7*Extent of Intent to Enroll in Online Courses Next Semester (Student Persistence, Q16)*

	N	Mean	SD
Extent of intent to enroll (Q16)	520	3.77	1.254

Note. N = numbers. Mean= the average of score 1 to 5 scales. SD = Standard Deviation. A measure of the dispersion of a set of data from its mean. Standard deviation was calculated as the square root of variance.

Core Set of Independent Variables: Distance Education Student Progress (DESP)

The four scales of the Distance Education Student Progress (DESP) Inventory consist of social integration, academic integration, external attribution, and academic incompatibility in distance education. These scales establish the four main factors that were tested in this study for their capacity to predict student persistence. The DESP inventory was developed by Kember et al. (1995) and remodeled by Lint (2011). The original DESP inventory is comprised of 68 items. However, this study omitted four items because they pertained to English language usage and were deemed as not relevant to a USHE audience. The DESP was designed to measure, through a five-point Likert scale, as follows: 1=Definitely Agree, 2=Agree, with reservations, 3=N/A, 4=Disagree, with reservations, and 5=Definitely Disagree. This study used a five-point Likert scale as well, yet the content of the scale was modified as follows: 1=Strongly Disagree, 2=Disagree, 3=Neither, 4=Agree, and 5=Strongly Agree.

For this research, the four scales of the DESP were defined as student perceptions. Social integration included three subscales with 11 items. The score range was 1 to 5 with higher scores associated with a greater level of social integration. Academic integration encompassed five subscales with 20 items. The score range was 1 to 5 with higher scores associated with a robust and developed academic integration. External attribution covered four subscales with 17 items, each with a score range of 1 to 5. Higher scores were related to advanced external attribution, which was considered to be a negative indication of social integration. Lastly, academic incompatibility involved four subscales and included 16 items. The score range was 1 to 5 with higher scores associated with a greater incompatibility, which exhibits the negative expression of academic integration. The mean and SD of student perceptions are detailed in Table 8.

Table 8*Mean Score and Standard Deviation of Student Perceptions*

	N	Minimum	Maximum	Mean	SD
Social Integration	520	1.00	4.00	2.58	.463
Academic Integration	520	1.15	4.60	3.42	.705
External Attribution	520	1.24	3.59	2.48	.401
Academic Incompatibility	520	1.00	4.06	2.53	.543

Note. N = numbers. Mean: the average of score 1 to 5 scales. SD = Standard Deviation. A measure of the dispersion of a set of data from its mean. Standard deviation was calculated as the square root of variance.

Presented in Table 9 are participants' mean scores on the four student perception variables, organized by students' indications of whether they intended to persist in online learning (in the next semester) or not. Item Q14 was the dichotomous variable of intent to enroll in online courses next semester. Ad.Q14 was the adjusted dichotomous variable of intent to enroll in online courses next semester. The two mean scores (and SDs) on social integration by "Yes" on student persistence were as follows: Q14=2.59 (0.448) and Ad.Q14=2.59 (0.453). The two mean scores on academic integration by "Yes" on student persistence were detailed as follows: Q14=3.44 (0.677) and Ad.Q14=3.43 (0.688). The mean scores on external attribution were: Q14=2.48 (0.390) and Ad.Q14=2.48 (0.389). The two mean scores on academic incompatibility were as follows: Q14=2.54 (0.528) and Ad.Q14=2.53 (0.528). The data displayed that the mean scores on social and academic integration were higher than those on external attribution and academic incompatibility.

Table 9*Mean Scores and SD for Student Perceptions by Student Persistence (Q14 & Ad.Q14)*

	Q14		Ad.Q14	
	Yes	No	Yes	No
Social Integration	2.59 (0.448)	2.53 (0.506)	2.59 (0.453)	2.55 (0.502)
Academic Integration	3.44 (0.677)	3.37 (0.789)	3.43 (0.688)	3.39 (0.774)
External Attribution	2.48 (0.390)	2.47 (0.436)	2.48 (0.389)	2.48 (0.447)
Academic Incompatibility	2.54 (0.528)	2.50 (0.589)	2.53 (0.528)	2.52 (0.604)

Note. Mean: the average of score on 1 to 5 scales. SD = Standard Deviation, a measure of the dispersion of a set of data from its mean. Standard deviation was calculated as the square root of variance.

The mean scores on student performance (GPA) and cost-benefit analysis by category of response to student persistence were revealed in Table 10. The two mean scores of GPA regarding persistence were as follows: Q14=1.99 (0.188) and Ad.Q14=1.99 (1.183), as almost all scores of student performance fell into the 2.1-3.0 category for GPA (coded at 2). The two mean scores for cost-benefit analysis pertaining to persistence were as follows: Q14=4.23 (1.217) and Ad.Q14=4.21 (1.241). The data indicated that the mean scores for cost-benefit analysis (Likert-scaled, with values from 1-5) were higher than for GPA as relates to persistence, and had greater variation.

Table 10*Mean Scores for Student Persistence (Q14 & Ad.Q14) by GPA, Cost-Benefit*

	Q 14		Ad.Q14	
	Yes	No	Yes	No
GPA	1.99 (0.188)	1.99 (0.157)	1.99 (0.183)	1.99 (0.172)
Cost-Benefit Analysis	4.23 (1.217)	4.01 (1.377)	4.21 (1.241)	4.05 (1.328)

Note. Mean: the average of score 1 to 5 scales. SD = Standard Deviation. A measure of the dispersion of a set of data from its mean. Standard deviation was calculated as the square root of variance.

Numbers and Percentages for Responses to Student Persistence (Q14 & Ad.Q14) by Learning Styles

In Table 11 one sees the numbers and percentages of student responses to Q14 and Ad.Q14, presented by learning style category.

Table 11

Number and Percentage of Student Responses to Student Persistence (Q14 & Ad.Q14) by Learning Style

Persistence	Q14		Ad.Q14	
	Yes n / %	No n / %	Yes n / %	No n / %
Visual	60 (15.1)	18 (14.6)	62 (14.8)	16 (15.7)
Auditory	217 (54.7)	71 (57.7)	227 (54.3)	61 (59.8)
Reading/writing	95 (23.9)	27 (22.0)	101 (24.2)	21 (20.6)
Kinesthetic	25 (6.3)	7 (5.7)	28 (6.7)	4 (5.7)
Total (N=520)	397	123	418	102

Note. N and n=numbers of “Yes” or “No.” %= percentage of overall score of “Yes” or “No.” Q14: Dichotomous variable of student persistence. Ad.Q14: Adjusted dichotomous variable of Q14.

The numbers and percentages of participant responses to student persistence by student characteristics were reported in Table 12. Coding for dichotomous variables was as follows: male was coded as 1 and female was as 0; age between 18-22 was coded as 1 and 23 and older was coded as 0; workforce development and certificate program were coded as 1 and academic degree was coded as 0; single/divorced/separated was coded as 1 and married/relationship was coded as 0; prior online experience was coded as 1 and no experience was 0.

Table 12

Number and Percentage of Student Responses on Student Persistence (Q14 & Ad.Q14) by Student Characteristics

Persistence	Q14		Ad.Q14	
	Yes (N/%)	No (N/%)	Yes (N/%)	No (N/%)
Gender				
Male	150 (37.8)	48 (39.0)	157 (37.6)	41 (40.2)
Female	247 (62.2)	75 (61.0)	261 (62.4)	61 (59.8)
Age				
18-22	59 (14.8)	25 (20.3)	65 (15.6)	19 (18.6)
23-over	338 (85.2)	98 (79.7)	353 (84.4)	83 (81.4)
Reason to Return to School				
Workforce/Certificate	342 (86.1)	99 (80.5)	360 (86.1)	81 (79.4)
Academic Degree	55 (13.9)	24 (19.5)	58 (13.9)	21 (20.6)
Relationship Status				
Single/Divorced	194 (48.9)	65 (52.9)	204 (48.8)	55 (53.9)
Married/Relationship	203 (51.1)	58 (47.1)	214 (51.2)	47 (46.1)
Online Experience				
Yes	97 (24.4)	22 (17.9)	101 (24.2)	18 (17.6)
No	300 (75.6)	101 (82.1)	317 (75.8)	84 (82.4)

Note. N and n=numbers of “Yes” or “No.” %= percentage of overall score of “Yes” or “No.” Q14: Dichotomous variable of student persistence. Ad.Q14: Adjusted dichotomous variable of Q14.

Bivariate Analyses

Correlations between Student Perceptions and Student Persistence

Tests of correlation between student perceptions and student persistence, the latter measured by dichotomous variables of Q14 and Ad.Q14, were conducted using the Spearman Correlation. These correlations are shown in Table 13. The Spearman correlations between student persistence (Q14 and Ad.Q14) and none of the student perception variables (social integration, academic integration, external attribution and academic incompatibility) were found to be significant.

Table 13

Spearman Correlation between Student Perceptions and Student Persistence (Dichotomous Variables Q14 & Ad.Q14)

	Q 14			Ad.Q14		
	<i>r</i>	<i>p</i>	N	<i>r</i>	<i>p</i>	N
Social Integration	.045	.310	520	0.15	.740	520
Academic Integration	-.004	.922	520	-.002	.962	520
External Attribution	-.001	.977	520	-.016	.714	520
Academic Incompatibility	-.029	.515	520	.014	.753	520

Note. *r* = Spearman correlation. N = Numbers. P = Probability. **p*<.05, ***p*<.01.

Tests of correlation between student perceptions and student persistence, continuous variable Q16, were conducted by using Pearson Correlation. As shown in Table 14, *Pearson Correlation between Student Perceptions and Student Persistence (Q16)*, social integration $r(201) = -.493^{**}$, $p = .000$, $p < .001$; academic integration $r(118) = .594^{**}$, $p = .000$, $p < .001$; external

attribution $r(118) = -.484^{**}$, $p = .000$, $p < .001$; and academic incompatibility $r = .455^{**}$, $p = .000$, $p < .001$ are all significantly correlated with student persistence, Q16.

Table 14

Pearson Correlation between Student Perceptions and Student Persistence (Q16)

	<i>r</i>	<i>p</i>	N
Social Integration	.493**	.000	520
Academic Integration	.594**	.000	520
External Attribution	.484**	.000	520
Academic Incompatibility	.455**	.000	520

Note. *r* = Pearson correlation. N = Numbers. *p* = Probability. * $p < .05$, ** $p < .01$, *** $p < .001$.

Correlations between Student Perceptions, Student Characteristics, GPA, Cost-Benefit Analysis and Student Persistence

Tests of correlation between student perceptions and each of (1) GPA and (2) cost-benefit analysis were conducted using the Pearson Correlation and are presented in Table 15. All four student perception variables were significantly correlated at the $p < .001$ level with cost-benefit analysis and none were significantly correlated with GPA.

Table 15*Pearson Correlation of Student Perceptions with GPA and Cost-Benefit Analysis*

	GPA			Cost-Benefit		
	<i>r</i>	<i>p</i>	<i>N</i>	<i>r</i>	<i>p</i>	<i>N</i>
Social Integration	.002	.969	520	.729**	.000	520
Academic Integration	.050	.253	520	.883**	.000	520
External Attribution	.070	.102	520	.764**	.000	520
Academic Incompatibility	.049	.261	520	.778**	.000	520

Note. *r* = Pearson correlation. *N* = numbers. *p* = Probability. **p*<.05, ***p*<.01, ****p*<.001.

Tests of the correlation between, on the one hand, (1) GPA and (2) cost-benefit analysis, and on the other hand, student persistence, measured by dichotomous variables of Q14 and adjusted Q14, were conducted by using the Spearman Correlation. Table 16 displays these correlations. The correlations between GPA and student persistence (Q14 and Ad.Q14) were not significant, whereas cost-benefit was significantly correlated with Q14 at the level of .05 based on the correlation coefficient $r(135) = .087^*$, $p = .048$, $p < .05$.

Table 16

Spearman Correlation of GPA and Cost-Benefit Analysis with Student Persistence (Q14 & Ad.Q14)

	Q14			Ad.Q14		
	<i>r</i>	<i>p</i>	N	<i>r</i>	<i>p</i>	N
GPA	-.005	.915	520	.000	.991	520
Cost-Benefit	.087*	.048	520	.069	.117	520

Note. *r* = Spearman correlation. N = numbers. *p* = Probability. **p*<.05, ***p*<.01.

Tests of the correlation of (1) GPA and (2) cost-benefit analysis with student persistence, continuous variable measured by item 16, were conducted by using Pearson's correlation. As shown in Table 17, of the Pearson Correlations between GPA, cost-benefit analysis and student persistence (Q16), only that between cost-benefit and student persistence was significant at the level of .01 based on the correlation coefficient $r(135) = .597^{**}$, $p = .000$, $p < .001$.

Table 17

Pearson Correlation of GPA and Cost-Benefit Analysis with Student Persistence (Q16)

	<i>r</i>	<i>p</i>	N
GPA	-.018	.677	520
Cost-Benefit Analysis	.597**	.000	520

Note. *r* = Pearson correlation. N = numbers. *p* = Probability. ***p*<.001

Correlations between Student Characteristics and Student Persistence

Tests of correlation between several student characteristics and student persistence, dichotomous variable of Q14 and adjusted Q14, were conducted by using the Spearman Correlation. In Table 18, the correlations between various student characteristics and student

persistence (Q14 & Ad.Q14) are indicated. As shown in Table 18, Spearman Correlations between each of the student characteristics of age and previous online experience with student persistence (Q14) were found to be significant at the level of .05 and .01, respectively. The correlation coefficient $r(140) = -.175^*$, $p = .042$, $p < .05$ for age. The correlation coefficient $r(142) = .219^{**}$, $p = .007$, $p < .01$ for prior online experience. In the case of Ad.Q14, there were no significant correlations between student characteristics and student persistence.

Table 18

Spearman Correlation between Student Characteristics and Student Persistence (Q14 & Ad.Q14)

	Q14			Ad.Q14		
	<i>r</i>	<i>p</i>	<i>N</i>	<i>r</i>	<i>p</i>	<i>N</i>
Gender	-.067	.433	520	-.082	.333	520
Age	-.175*	.042	520	-.075	.379	520
Reason to Return to School	-.132	.146	520	-.145	.110	520
Marital Status	-.113	.189	520	.012	.889	520
Online Experience	.219**	.007	520	.159	.060	520

Note. *r* = Spearman correlation. *N* = numbers. *p* = Probability. * $p < .05$, ** $p < .01$.

Tests of the correlation between various student characteristics and student persistence (the continuous variable, Q16) were conducted using the Spearman Correlation. Exhibited in Table 19 are the Spearman Correlations between various student characteristics and student persistence (Q16), none of which is significant except for the correlation between prior online

course experience and student persistence (Q16), which is at the level of .05 according to the correlation coefficient $r(142) = -.102^*$, $p = .020$, $p < .05$.

Table 19

Spearman Correlation between Student Characteristics and Student Persistence (Q16)

	<i>R</i>	<i>p</i>	N
Gender	-.039	.371	520
Age	.066	.135	520
Reason to Return to School	-.010	.823	520
Relationship Status	.030	.498	520
Online Experience	-.102*	.020	520
LS Visual	.013	.895	520
LS Auditory	-.046	.601	520
LS Reading/W	.059	.504	520

Note. r = Spearman correlation. N = numbers. p = Probability. * $p < .05$, ** $p < .01$.

Multivariate Analyses of Student Persistence

The two central models of analysis for this study used logistic regression analysis and multiple regression analysis. This was accomplished with the goal to examine relationships between student perceptions and student persistence. The logistic regression analysis was utilized for the dichotomous variables of Q14 and Ad.Q14 relating to student persistence. The multiple regression analysis was applied for the continuous variable, Q16, relating to student persistence.

The first stage of analysis addressed in the research question was: Is there a statistically significant relationship between student perceptions of the academic experience of (a) social

integration, (b) academic integration, (c) external attribution, and (d) academic incompatibility with student persistence (within the online learning environment at the community college level)? An aspect of this question was: Does the relationship statistically vary with respect to student characteristics and learning style?

Logistic and Multiple Regression Analyses: Predicting Student Persistence with Student Perceptions

To answer this first research question, RQ1, the study employed logistic regression analysis for the dichotomous variables of Q14 and Ad.Q14. This was completed to verify the relationship among student perceptions, student characteristics, learning styles and student persistence. The research then used multiple regression analysis to identify the relationship between student perceptions and student persistence based on Q16.

The first regression analyses appear in Table 20, *Logistic Regression Analyses for Student Perceptions and Student Persistence (Q14 & Ad.Q14)*. For questions Q14 and Ad.Q14, the intent of enrollment in online coursework the following semester, the dependent variable was student persistence. “Yes,” indicating intent to enroll was coded as 1; “No,” representing intent to enroll was coded as 0. Independent variables were identified as social integration, academic integration, external attribution, and academic incompatibility. For Q14, a total of 520 cases were processed and analyzed. The model was found to be reliable (chi-square= 24.188, df=4, $p=.000$, $p<.001$). This model accounted for between 19.1% and 26.6% of the variance in student persistence. Overall 79.6% of predictions were accurate, and 82.7% of the predictions for student persistence were accurate. External attribution was found to be a predictor of student persistence (Q14) by a factor of .159 at the level of $p<.01$. Academic incompatibility also was found to be a predictor of student persistence (Q14) by a factor of 3.796.

The adjusted Q14 was re-coded from “No” to “Yes” if participants responded to the item about *reason to withdraw from the next online courses* (Q16b) with “transfer” or “graduation.” The model for Ad.Q14 was found to be reliable (chi-square= 10.416, df=4, p=.034, p<.05). This model accounted for between 9.6% and 11.8% of the variance in student persistence. Overall, 76.0% of predictions were accurate, and 94.6% of predictions for the student persistence were accurate. External attribution (OR=.214*) was found to be important for predicting student persistence (Ad.Q14) at the level of p<.05.

Table 20

Logistic Regression Analyses for Student Perceptions and Student Persistence (Q14 & Ad.Q14)

	Q14		Ad. Q14	
	<i>OR</i>	<i>95% CI</i>	<i>OR</i>	<i>95% CI</i>
Social Integration	2.108	[.898, 5.210]	.971	[.378, 2.494]
Academic Integration	3.225	[.856, 10.792]	1.780	[.506, 6.269]
External Attribution	.159**	[.049, .565]	.214*	[.60, .763]
Academic Incompatibility	3.796**	[1.299, 12.408]	2.763	[.895, 8.531]
Constant	.011		2.065	

Note. OR = odds ratio; CI = confidence interval. * $p < .05$. ** $p < .01$

In Table 21, the relationship between student perceptions and student persistence (Q16), the extent of intent to enroll in online coursework the following semester, was analyzed by a multiple regression analysis. The linear assumption was checked by homoscedasticity performing a simple scatter plot (X=Zpred and Y=Sdresid). Normality assumption was checked by Histogram and Normal P-P plot. Collinearity assumption was checked by Tolerance/VIF. The

result of multiple regression showed that 13.9% of variance could be explained by $F(4,314)=5.724, p=.000, p<.01$. The model was deemed as reliable and is exhibited in Table 21. In this section, variables of social integration, external attribution, and academic incompatibility were not found to be important predictors. Academic integration ($\beta= .266, t= 2.80, p<.01$) was an identified predictor.

Table 21*Multiple Regression Analysis for Student Perceptions and Student Persistence (Q16)*

	Q14			Ad. Q14
	<i>B</i>	β	<i>t</i>	95% <i>CI</i>
Constant	-.895		.489	[-4.311, 2.541]
Social Integration	.424	.171	1.830	[-.20, .963]
Academic Integration	.890	.266**	2.590	[.293, 1.316]
External Attribution	-.540	-.191	-1.570	[-1.130, .034]
Academic Incompatibility	.449	.155	1.502	[-1.051, .896]
<i>R</i>²	.174			
F	5.724***			
ΔR^2	.143			
ΔF	5.724***			

Note. CI = confidence interval. ** $p < .01$, *** $p < .001$

Hierarchical Logistic and Multiple Regression Analyses: Exploring Covariance of Student Characteristics and Learning Styles

The second part of RQ1 is to determine whether differences existed between student perceptions and student persistence using covariance of student characteristics and learning styles. For this question, a hierarchical logistic regression analysis was used for the dichotomous variables of Q14 and Ad.Q14. For the continuous variable of Q16, the hierarchical multiple regression analysis was used to identify a relationship. Student characteristics and learning styles were input in block 1 and student perceptions were input in block 2 in both the hierarchical

logistic regression and multiple regression test in SPSS. Learning styles were blind coded because they were categorical variables.

In Table 22, the outcome between student perceptions and student persistence (Q14) was analyzed by hierarchical logistic regression analysis. For Q14, intent of enrollment for online course in the next semester, 'Yes' was coded as 1, and 'No' was coded as 0. For analyzing collected data, a coding of 1 for each characteristic was as follows: Male (1), Single (1), Workforce development/Certificate program (1), Age 18-22 (1), and Prior online course experience (1). Model 1 was found to not be reliable (chi-square= 13.23, df=1012, p=.140143, $p > .05$). This model accounted for between 12.95% and 19.22% of the variance in student persistence. Overall, 72.47% of predictions were accurate, and 88.65% of predictions for student persistence were accurate. Lack of prior online experience was found to be a predictor of student persistence (Q14) by a factor of 3.050.

Model 2 was found to be reliable (chi-square= 25.928, df=14, $p = .025$, $p < .05$). This model accounted for between 21.22% and 34.13% of the variance in student persistence. Overall, 82.47% of predictions were accurate, and 89.29% of predictions for student persistence were accurate. Interestingly, a lack of prior online experience increased the odds of student persistence by a factor of 3.472. External attribution was indicated as a “predictor” of student persistence, decreasing persistence by an odds-ratio factor of .149**. Academic incompatibility was also found to be a predictor for student persistence by a factor of .755. Based on this outcome, participants who had no prior online experience expressed a notable intent of persistence. Lower external attribution exhibited that a stronger intent of persistence would take place.

Table 22

Hierarchical Logistic Regression Analyses Predicting the Variance among Student Perceptions, Student Characteristics, and Student Persistence (Q14)

	Model 1		Model 2		95% CI
	B	OR	B	OR	
Constant	-.688	.503	-.132	.876	
Gender	-.117	.890	.148	1.160	[.302, 4.452]
Age	-1.578	.206	-1.210	.298	[.044, 2.041]
Reason for Return to School	-.931	.394	*.802	.448	[.153, 1.314]
Marital Status	1.366	3.920	1.376	3.958	[.612, 25.614]
Online Experience	1.115*	3.050*	1.245*	3.472*	[1.127, 10.700]
LS Visual	.430	1.430	.150	1.207	[.234, 6.180]
LS Auditory	1.497	4.529	1.470	4.324	[.450, 42.912]
LS Reading W.	.891	2.379	.599	1.698	[.321, 12.161]
Social Integration			.462	1.587	[.541, 4.652]
Academic Integration			.327	1.387	[.327, 5.893]
External Attribution			-1.904**	-.149**	[.036, .623]
Academic Incompatibility			.755*	2.128*	[.584, 7.758]

Note. B = Coefficient, OR = Odds Ratio, CI = Confidence Interval. Model 1 was controlled for student characteristics and learning styles without student perceptions. Learning styles were dummy coded with reference of kinesthetic. Model 2 included student perceptions. * $p < .05$, ** $p < .01$

In Table 23, the outcome between student perceptions and student persistence, in terms of intent to enroll (Ad.Q14), is analyzed with a hierarchical logistic regression analysis. Model 1 was not found to be reliable (chi-square= 11.505, df=10, $p=.330$, $p>.05$). This model accounted

for between 12.3% and 18.6% of the variance in student persistence. Overall 79.2% of predictions were accurate, and 95.4% of predictions of student persistence were accurate. No variable in this model was exhibited as a predictor in student persistence. Model 2 was also not found to be reliable (chi-square= 20.674, df=14, p=.110, p>.05). This model accounted for between 19.7% and 25.9% of the variance in student persistence. Overall, 82.6% of predictions were accurate, and 94.4% of predictions of student persistence were accurate. External attribution and previous online experience were found to be predictors for student persistence. External attribution decreased persistence by a factor of .146**. Lower external attribution was associated with higher intent of persistence in Ad.Q14.

Table 23

Hierarchical Logistic Regression Analyses Predicting the Variance among Student Perception, Student Characteristics, Learning Styles, and Student Persistence (Ad.Q14)

	Model 1		Model 2		
	<i>B</i>	OR	<i>B</i>	OR	95%CI
Constant	-.690	.510	-.130	.880	
Gender	-.120	.895	.150	1.164	[.305, 4.455]
Age	-1.581	.201	-1.215	.290	[0.48, 2.051]
Relationship status	1.370	3.922	1.380	3.966	[.610, 25.701]
Previous online experience	1.119*	3.055*	1.250*	3.479*	[1.129, 10.680]
LS Visual	.422	1.520	.155	1.174	[.231, 6.088]
LS Auditory	1.534	4.690	1.501	4.432	[.435, 43.698]
LS Reading/W	.890	2.451	.693	1.983	[.319, 12.167]
Social Integration			.470	1.591	[.551, 4.666]
Academic Integration			.319	1.375	[.339, 5.931]
External Attribution			-1.906**	.146**	[.039, .637]
Academic Accountability			.763	2.130	[.588, 7.762]

Note. B = Coefficient, OR = Odds Ratio, CI = Confidence Interval. Model 1 was controlled for student characteristics and learning styles without student perceptions. Learning styles were dummy coded with reference of kinesthetic. Model 2 included student perceptions. * $p < .05$.

The outcome of student persistence with respect to intent to enroll (Q16) was analyzed using a hierarchical multiple regression analysis in Table 24. The linear assumption was checked by homoscedasticity with a simple scatter plot ($X=Z_{pred}$ and $Y=S_{dresid}$). Normality assumption was checked by Histogram and Normal P-P plot. Collinearity assumptions were checked by Tolerance/VIF. The result of multiple regressions exhibited that 9.2.0% of variance can be explained by $F(12,80)=1.544$, $p=.080$, $p>.05$. The model was not significant. As shown in Table 24, external attribution ($(\beta= -.802$, $t= -2.290$, $p<.05)$) was a predictor of student persistence as

measured by Q16 (extent of intent to enroll in online coursework the following semester). Lower external attribution influenced higher extent of persistence (Q16).

Table 24

Hierarchical Multiple Regression Analysis Predicting the Variance of Student Perception, Student Characteristics, and Student Persistence (Q16)

Model 2			
	Model 1 B	B	95%CI
Constant	2.788**	1.543	[-3.33., 5.980]
Gender	.308	.385	[-.342, 1.011]
Age	-.630	-.422	[-1.255, .388]
Relationship status	.490	.502	[-.244, 1.290]
Online experience	.670	.621	[-.745, .944]
LS Visual	.180	.081	[-.890, 1.382]
LS Reading	.245	.190	[-.782, 1.222]
Social Integration		.398	[.151, .930]
Academic Integration		.460	[.329, 1.331]
External Attribution		-.802*	[-1.462, -.069]
Academic Accountability		.138	[-.602, .918]
R²	.105	.250	
F	.970	1.755	
ΔR²		.095	
ΔF		3.337	

Note. CI=Confidence interval. Model 1 was controlled for student characteristics and learning styles without student perceptions. Learning styles were dummy coded with reference of kinesthetic. Model 2 included student perceptions. * $p < .05$, ** $p < .01$

Regression Analyses Exploring Mediation by Student Performance (GPA)

The next stage of analysis tested research question RQ2: Is there a statistically significant relationship between student perceptions of the academic experience of (a) social integration, (b)

academic integration, (c) external attribution, and (d) academic incompatibility, and student persistence, as mediated by student performance (GPA)?

To answer RQ2, research measured the mediation effect as to the relationship between student perceptions and student persistence. This was accomplished by measuring the mediating effect of GPA on the relationship between student perceptions and student persistence by utilizing the four steps of Baron and Kenny (1986). Step one applied a logistic regression analysis in a search for a relationship between student perceptions and student persistence of Q14 and Ad.Q14. Step two examined the correlation among student perceptions and GPA. Step 3 sought to clarify whether the mediator exhibited an effect on student persistence. In this step, student perceptions were controlled, establishing the effect of GPA. Lastly, the effect of student perceptions and student persistence controlling for GPA was set at zero to establish a GPA completely mediated to the relationship. In this study, Sobel test was used to measure the indirect effect, mediation.

In Table 25, the *Regression Analyses for Student Perceptions and Student Persistence (Q14) Mediated by GPA*, external attribution ($B = -1.440$, $p < .01$) and academic incompatibility ($B = 1.438$, $p < .05$) exhibited a significant preliminary relationship with student persistence, Q14. After controlling student perceptions, GPA ($B = .860^{**}$, $p < .01$) had a significant relationship with student persistence Q14. External attribution and academic incompatibility still had significant relationships with student persistence, but these changed after controlling GPA, which suggested a possible partial mediation effect. The researcher implemented the Sobel test to clarify the fact. The test statistics for the Sobel tests of external attribution ($p = .342$) and academic incompatibility ($p = .540$) did not fall below the alpha level of .05. The outcome indicated that no

relationship between student perceptions and student persistence was influenced significantly by the inclusion of GPA. There was no evidence of mediation by GPA.

Table 25

Regression Analyses for Student Perceptions and Student Persistence (Q14) Mediated by GPA

DV/MV	Q14		GPA		GPA +Q14		Sobel Test	
	B	SE	B	SE	B	SE	B	P
Social Integration	.742	.450	-.182	.160	.859	.463	-1.005	.313
Academic Integration	1.165	.624	.397	.245	1.049	.666	1.422	.177
External Attribution	-1.440**	.624	.222	.216	-1.924**	.650	.954	.342
Academic Incompatibility	1.438*	.567	-.139	.209	1.404*	.587	-.619	.540
GPA					.860**	.295		
Constant	-.4.479	3.420	2.045	1.361	-6.650	3.735	.	

Note. Q14 = Dichotomous variable of student persistence. Logistic regression analysis was used. SE = Standard error. B = Regression coefficient. * $p < .05$, ** $p < .01$

Table 26 exhibits the *Regression Analyses for Student Perceptions and Student Persistence (Ad.Q14) Mediated by GPA*. There was a significant relationship found to exist between external attribution ($B = -1.545^{**}$, $p < .01$) and student persistence Ad.Q14. After controlling student perceptions, there was a significant relationship between GPA ($B = .871^{**}$, $p < .01$) and student persistence Ad.Q14. External attribution was still significant but reduced after controlling GPA, which implied a partial mediation effect. The researcher operated the Sobel test to verify the actuality. The test statistic for the Sobel test of external attribution ($p = .330$) did not fall below the alpha level of .05. The outcome indicates that no relationship between student

perceptions and student persistence (Ad.Q14) was influenced significantly by the inclusion of GPA.

Table 26

Regression Analyses for Student Perceptions and Student Persistence (Ad.Q14) Mediated by GPA

DV _s /MV	Ad. Q14		GPA		GPA +Ad. Q14		Sobel Test	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>p</i>
Social Integration	-.034	.485	-.184	.164	.146	.515	-1.030	.303
Academic Integration	.577	.638	.393	.249	.366	.719	1.422	.152
External Attribution	-1.545**	.648	.228	.216	-1.880**	.690	.978	.324
Academic Incompatibility	1.018	.569	-.139	.215	1.116	.618	-.627	.539
GPA					.871**	.288		
Constant	.721	3.688	2.059	1.355	-1.190	4.017	.	

Note. Ad.Q14 = Adjusted student persistence. Logistic regression was used. SE: = Standard error. B = Regression coefficient. * $p < .05$, ** $p < .01$.

In a related regression analysis (no table included) that explored the possible mediating effect of GPA on the relationship between student perceptions and student persistence (measured by Q16), there is an indication of a significant initial relationship between academic integration ($B = .890^*$, $p < .05$) and student persistence Q16. After controlling student perceptions, there was a significant relationship established between GPA ($b = .379^{**}$, $p < .01$) and student persistence Q16. Academic integration was noted as a significant influence, but with reduced effect after controlling the GPA. The Sobel test was used in an attempt to clarify the data. The statistic for the Sobel test of academic integration ($p = .155$) did not fall below the alpha level of .05 with academic integration ($B = .580^*$, $p < .05$) as a significant item. The outcome indicated that student perceptions and student persistence (Q16) had no significant relationship mediated by GPA.

After controlling for student progress factors, GPA exhibited a significant relationship with student persistence items Q14 and Ad.Q14. For Q14, external attribution and academic incompatibility were found to be significant, but were reduced after controlling GPA, which implied a partial mediation effect. Nevertheless, this was not validated by the Sobel test. For Ad.Q14, as indicated in Table 26 above, only external attribution was deemed as significant, but the Sobel test failed to validate a mediating effect of GPA. For Q16, only academic integration had a relationship with persistence that appeared to be mediated by GPA, yet the Sobel test failed here in the end as well.

Regression Analysis Exploring Mediation by Cost-Benefit Analysis

The final stage of analysis in this study addresses RQ3: Is there a statistically significant relationship between, on the one hand, student perceptions of the academic experience of (a) social integration, (b) academic integration, (c) external attribution, and (d) academic

incompatibility, and on the other hand, student persistence as mediated by cost-benefits? To answer this question, the research focused on the measured mediation effect on the relationship between student perceptions and student persistence. To measure the mediated effect by cost-benefit on relationships between each student perception variable and student persistence, the research applied Baron and Kenny's (1986) four steps. In step one of this process, the logistic regression analysis was utilized to determine the relationship among student perceptions and student persistence of Q14 and Ad.Q14. Multiple regression analysis was utilized for student persistence of Q16. Step two was a search to find the correlation between student perception and cost-benefits. Step three sought to make clear whether the mediator applied had affected student persistence. Logistic regression analysis between student perception and cost-benefits as predictors and student persistence as criteria was utilized for Q14 and Ad.14. Multiple regression analyses were similarly employed for student persistence of Q16. In this step, student perceptions were controlled in an attempt to establish the effect of cost-benefits.

The effect of student perceptions and student persistence, controlling for cost-benefit analysis, was set at zero to establish that cost-benefits completely mediated the relationship. The Sobel test was then used in an attempt to measure the indirect effect of mediation. Table 27, *Regression Analyses for Student Perceptions and Student Persistence (Q14) Mediated by Cost-Benefit Analysis*, indicates the following initial results with respect to the relationship with persistence: external attribution ($b = -1.798$, $p < .01$) and academic incompatibility ($b = 1.406$, $p < .05$). These variables exhibit a significant initial relationship with student persistence (Q14). However, after controlling student perceptions, no significant relationship was found between cost-benefits ($b = .292$, $p > .05$) and student persistence Q14. The test statistic for the Sobel test of external attribution ($p = .442$) and academic incompatibility ($p = .422$) did not fall below the alpha

level of .05. This outcome indicates that none of the relationships between student perceptions and student persistence (Q14) exhibit influence by the inclusion of a cost benefit-analysis in this research.

Table 27

Regression Analyses for Student Perceptions and Student Persistence (Q14) Mediated by Cost-Benefit Analysis

DV/s/MV	Q14		Cost-Benefit		Cost-B +Q14		Sobel Test	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>p</i>
Social Integration	.749	.456	.129	.117	.689	.454	.664	.514
Academic Integration	1.173	.624	.366*	.167	1.069	.633	1.774	.433
External Attribution	-1.798**	.624	.291	.145	-1.943**	.649	.761	.442
Academic Incompatibility	1.406*	.561	.368**	.147	1.234*	.573	.791	.422
Cost-Benefit					.292	.355		
Constant	-4.499	3.422	-.541	.929	9.347*	3.800	.	

Note. Q14 = dichotomous variable of student persistence. Logistic regression analysis was used. SE:= Standard error. B= Regression coefficient. * $p < .05$, ** $p < .01$

As displayed in Table 28, *Regression Analyses for Student Perceptions and Student Persistence (Ad.Q14) Mediated by Cost-Benefits Analysis*, there was a significant initial relationship between external attribution ($b = -1.570^*$, $p < .05$) and student persistence, Ad.Q14. After controlling student perceptions, there was no significant relationship between cost-benefits ($b = .180$, $p > .05$) and student persistence Ad.Q14. The test statistic for the Sobel test of external attribution ($p = .670$) did not fall below the alpha level of .05. The outcome indicated that no

relationship among student perceptions and student persistence was influenced significantly by the inclusion of cost-benefits. There was no evidence of mediation by cost-benefits.

Table 28

Regression Analyses for Student Perceptions and Student Persistence (Ad.Q14) Mediated by Cost-Benefit Analysis

IV's	Ad. Q14		Cost		Cost-B +Ad. Q14		Sobel Test	
	B	SE	B	SE	B	SE	B	P
Social Integration	-.028	.477	.130	.120	-.077	.502	-.418	.690
Academic Integration	.580	.662	.380*	.181	.657	.688	-.442	.676
External Attribution	1.570*	.650	.226	.220	-1.510*	.683	-.454	.670
Academic Incompatibility	1.120	.645	.410	.166	1.102	.625	-.421	.731
Cost-Benefit					.180	.299		
Constant	.625	3.554	-.490	1.010	.620	4.722		

Note. Cost = Cost-benefit Analysis. Ad.Q14 = Adjusted student persistence. Logistic regression was used. SE = Standard error. B = Regression coefficient. * $p < .05$.

In Table 29, *Regression Analyses for Student Perceptions and Student Persistence (Q16) Mediated by Cost-Benefit Analysis*, a significant initial relationship is indicated between academic integration ($b = .880^*$, $p < .05$) and student persistence, Q16. After controlling student perceptions, there was no significant relationship between cost-benefits ($b = .288$, $p > .05$) and student persistence, Q16. Therefore, it was not required to implement the Sobel test. Yet the researcher performed the Sobel test to verify the fact. The test statistic for the Sobel test of academic integration ($p = .190$) did not fall below the alpha level of .05. The outcome indicated

that no student perceptions and student persistence (Q16) had significant relationships mediated by cost-benefits. There was no evidence of mediation of cost-benefits.

Table 29

Regression Analyses for Student Perceptions and Student Persistence (Q16) Mediated by Cost-Benefit Analysis

	Q16		Cost-Benefit		Cost-B +Q16		Sobel Test	
IV's	B	SE	B	SE	B	SE	B	P
Social Integration	.430	.230	-.135	.125	.379	.213	.922	.357
Academic Integration	.880*	.322	.395*	.157	.801*	.315	1.366	.190
External Attribution	-.563	.290	.306	.155	-.647*	.294	1.366	.190
Academic Incompatibility	-.563	.290	.306	.155	-.647*	.294	1.301	.210
Cost-benefit					.288	.1.87		
Constant	-.910	1.797	-.559	.947	-.810	1.792		

Note. Q16= Continuous variable of Student Persistence. Multiple regression analysis was used. S = Standard error. B= Regression coefficient. * $p < .05$.

Null Hypothesis

In this research, the null hypothesis is identified as the following: “Social integration, academic integration, external attribution, and/or academic incompatibility have no statistical relationship with student persistence.” Through the analyses applied in this research, which largely replicate those applied by Lint (2011), these student perception factors were found to have a range of predictive effects on student persistence (Q14, Ad.Q14, and Q16), which measured in various ways students’ intent to enroll in an online course next semester. The results ranged from no effect of social integration on persistence (other than the Pearson correlation that all four variables had with persistence as measured by Q16) to the predictive effect found for

external attribution on all three of the variables used to measure persistence (Q14, Ad.Q14, and Q16). This research identified that it was important to recognize that external attribution was found to be a predictor of student persistence, specifically of intent to enroll in an online course the next semester.

Results

Research Question 1

For research question 1, this study employed a series of regression analyses to discern the predictive power of student progress factors (social integration, academic integration, external attribution, and academic incompatibility), as well as several student characteristics, upon student persistence. It employed logistic regression and hierarchical logistic regression analyses to investigate the impact of these factors on the dichotomous variables of Q14 and Ad.Q14. For persistence as measured by Q16, this study used multiple regression and hierarchical multiple regression analyses to identify the level of impact of these various factors.

In the multiple regression analysis of student persistence on student perceptions, the independent variables of *social integration*, *external attribution*, and *academic incompatibility* were not found to be predictors of Q16, but *academic integration* was predictive of Q16.

In the logistic regression analysis of student persistence on student perceptions, *external attribution* (OR=.159) was determined to be a predictor of student persistence (Q14) and *academic incompatibility* was determined to be a predictor of student persistence (Q14). In addition, *external attribution* (OR=.214) was also determined to be a predictor of student persistence (Ad.Q14).

In a hierarchical logistic regression analysis of student persistence (Q14) on student perceptions and characteristics, *external attribution* predicted student persistence (Q14),

decreasing it by a factor of .149**. Lower *external attribution* thus predicted a stronger intent to persist in online coursework. In this same analysis, *academic incompatibility* significantly predicted student persistence (Q14) by a factor of 2.128*. Furthermore, *lack of prior online experience* significantly predicted student persistence by a factor of 3.055*. Participants who had no *prior online experience* expressed a notably higher intent of persistence.

In a similar hierarchical logistic regression analysis of student persistence, as measured by Ad.Q14, *external attribution* decreased persistence by a factor of .146** and *previous online experience* predicted persistence by a factor of 3.479.

A hierarchical multiple regression analysis of student persistence (Q16) found *external attribution* ($B = -.802, p < .05$) to be a significant predictor of student persistence. Lower *external attribution* predicted a higher intent to persist in online learning.

The null hypothesis was therefore rejected, given that both *academic integration* and *academic incompatibility*—and above all, *external attribution*—demonstrated predictive power on persistence through the regression analyses.

Research Question 2

For research question 2, research measured the mediation effect of student performance (GPA) on the relationship between the four established student progress factors and student persistence. To measure the mediating effect of student performance, this research applied Baron and Kenny's (1986) four steps. After controlling student progress factors, GPA was shown to have had no mediating role in the relationship between with the student progress factors and any of the three measures of student persistence (Q14, Ad.Q14, and Q16). In some analyses, there was an initial relationship between a student progress factor and one or more of

the dependent variables, but this significance disappeared after controlling for the predictor variable. In other analyses, effects persisted after control but there was never a significant initial relationship between the predictor variable and GPA. In still other cases, significant preliminary relationships were identified but the Sobel test did not support a significant effect. The null hypothesis of no mediating effect on the part of student performance was thus accepted.

Research Question 3

For research question 3, this research measured the mediation effect of cost-benefit analysis on the relationship between the four established student progress factors and student persistence. To measure the mediating effect of student performance, this research applied Baron and Kenny's (1986) four steps. After controlling student progress factors, cost-benefit analysis was shown to have had no mediating role in the relationship between student progress factors and any of the three measures of student persistence (Q14, Ad.Q14, and Q16). In some analyses, there was an initial relationship identified between a student progress factor and one or more of the dependent variables, but this significance disappeared after controlling for the predictor variable. In other stages of analysis, preliminary relationships were established but the Sobel test did not support a significant effect. The null hypothesis of no mediating effect on the part of cost-benefit analysis was thus accepted.

Summary

A sample of students (N = 520) who enrolled in online, deved courses consented and then responded to the requisite online survey. The first null hypothesis posed was that a statistical relationship would not be found between student progress factors (and secondarily, student characteristics) and student persistence. External attribution in particular (and to a lesser extent,

academic incompatibility and academic integration) was found to predict student persistence in online courses for students enrolled in deved. The null hypothesis was rejected. External attribution was found to be a critical factor, consistently, for student persistence of intent to enroll next semester and was a crucial factor for all three measures of student persistence.

Neither student performance (GPA) nor cost-benefit analysis was shown to exhibit a mediating role in any of the relationships between the four student progress factors and the three measures of student persistence.

These findings are a duplication of Kember's (1995) theory of distance education learners. Data as presented here are a direct continuation of Tinto's (1975), Kember's (1995) and Lint's (2011) validation of the evolution of distance learning. Tinto called this phenomenon "social integration" (1971). Kember (1995) advanced Tinto by adding "external attribution" to the modeling in an attempt to incorporate additional causal factors appropriate to an adult, distance-based student (Kember, 1995). In this study, the measurement of external attribution as a primary indicator of student persistence is key.

In Chapter 5, I discuss the findings, recommendations for future research, and the implications for organizational practitioners and positive social change.

CHAPTER V: Discussion and Conclusions

Introduction

One purpose of this study was to determine if social integration, academic integration, external attribution, and academic incompatibility were predictive for student persistence and completion. A second purpose of the study was to examine factors for student persistence and the overall phenomenon of Kember's (1995) construct of *external attribution*. Simply put, the findings of this quantitative study indicate that external attribution has a *relationship to student persistence in online learning*. This is a fact and the data presented here exhibit this. The findings of this study further indicate that academic incompatibility and academic integration exhibit a relationship with student persistence.

There is a lack of research in the literature examining *external attribution* (Lint, 2011). Very few studies exist on record in the peer-reviewed literature that have examined both online learning students and perceptions of “social integration, academic integration, external attributions, and academic incompatibility” as predictors of persistence and completion (Lint, 2011). Prior to the data analysis of this study, no previous research existed that studied online students enrolled in a suite of deved courses. In contrast with Lint (2011), rather than applying a modified Kember (1995) model to students enrolled in a business school, this research focused on college-readiness courses.

The data for this study were collected independently from the researcher and provided by the Catalyst Educational Research Center, Inc. (CERC), a not-for-profit educational research organization located in Chicago, Illinois. The six courses were offered free of charge to 520 students concurrently enrolled in community college classes in Illinois. Curricula for the courses were developed according to guidelines issued by the Illinois Community College Board for

deved courses and involved a progressive, modular format. Students attended courses online from August 4, 2014 through December 22, 2014. Academic support for students enrolled in the six courses was provided by CERC personnel using email, chat, Skype and social media sites. Students were also directed to make skillful use of collaborative, open-sourced instructional resources.

The findings of this research indicate that *external attribution had a significant effect on student persistence*. A second positive and statistically important finding is that academic incompatibility and academic integration also demonstrate an effect on student persistence. In follow-up analysis, a statistical relationship indicated that external attribution has a negative relationship to student persistence in online learning. Finally, social integration, academic integration, external attributions, and academic incompatibility were all found to be factors for student persistence and completion in deved, online-based e-learning courses.

Simply put, the findings of this quantitative study indicate that external attribution has a negative relationship to student persistence in online learning. These results further indicate that academic incompatibility and academic integration exhibit a positive relationship with student persistence.

Data analysis for RQ1 shows external attribution as a critical factor consistently in student persistence of intent to enroll next semester. After controlling data with a covariate of student characteristics, only external attribution (among all variables) was shown to be a crucial factor for all three measures of student persistence applied in this research. Negative attribution was identified as a distraction, thus reducing student learning time, hindering focus on study time and having a negative effect on persistence. Based on the outcomes presented in the data here, addressing the issues of lowering external attribution should be a key area of focus in an attempt

to increase student persistence. Academic incompatibility and academic integration were also shown to be noteworthy (though less powerful) predictors for student persistence (Q14 and Q16, respectively) and should be investigated further.

This study employed the DESP of Kember (1997) and the SOAP of Strevy (2009). It also utilized the analytics as performed by Lint (2011). The researcher found little value in the use of Ad.Q14 as an analytic tool. This was due in part to the recoding of students with respect to “intent to persist”. This recoding makes a large assumption as to student intent and was found to be confusing and not a constructive path for analyzing the data. In her study, Lint (2011) utilized thirty-four tables to display data collected. In this research, an attempt was made to replicate this method. In the employment of this method, this research created much discourse and consternation among the dissertation committee assembled to review this research. Future research would be better served by reducing the selection of data and analyses to be presented. Research also found that the use of the Spearman Correlation, hierarchical logistic regression and multiple regression may not be the most appropriate methods to analyze this type of data. It would be interesting to review the data utilizing chi-square and Pearson’s only.

Academic integration was also shown to be an important factor for student persistence to the extent of intent to enroll in an online course the next semester. Academic integration, as reflected in this data, could be used in future online pedagogy development to reinforce the specific needs of both the teaching and learning of students. Immediate steps such as: improving online student support, development of specific online curriculum, and the investment in the creation of open source e-books could lead in the establishment of best practices.

Providing a more tailored approach to course delivery could be an important key to increasing academic integration for students (Lint, 2011). The courses established by CERC

were simple instruction that lead to an attainable outcome. This fact and the current experience that traditional and non-traditional students have with, and their interest in using, social networking sites suggest a possible opportunity worth exploiting. At a minimum, e-learning could be used as a low-cost addition to current educational offerings—not as a replacement for but as an alternative to current, on-ground offerings. Low-cost alternatives such as the one piloted in this research should be replicated, scaled-up and further assessed, immediately.

Additionally, an outcomes-based approach to student support in the online environment must be utilized. A flexible support-delivery infrastructure could free up student time during periods when external influences are most disruptive to the academic success of adult students. Lastly, lack of prior online experience did not adversely affect student persistence. It is assumed that levels of positive student interaction in the classroom directly impact levels of student persistence (Lint, 2011). Therefore, students committed to online coursework should be nurtured as individuals, directed as seekers (and constructors) of knowledge, and directed / supported through a continuous process of how to build on the successes of online study in an independent learning environment.

Interpretation and Implications

It was Kember (1992) and Tinto (1975) who advanced Durkheim's (1997) initial discovery of the impact of social integration. They argued for recognition of the importance of social integration and academic integration as crucial factors leading to student dropout or student persistence. Kember (1995) included the negative sources of external attribution and academic incompatibility as harmful factors that also shape student persistence. The findings of this quantitative analytic study exhibit how student perceptions apparently predict or influence student persistence for students engaged in online deved courses. A principal critique of

Kember's work is that the model predates the open access that we see in today's internet and that it furthermore does not take into account the modern social media phenomenon. The research conducted in this study dispels this line of attack by demonstrating the persisting relevance of Kember's model to contemporary learning and educational conditions and opportunities.

In this study, external attribution was the most noteworthy factor to have a direct influence on student persistence. It can be extrapolated that multiple negative sources (i.e. family, employment, and life) are external factors that put the student at greatest risk for failing to complete coursework or programs of study. The negative attribution that distracts students from learning is associated with insufficient time and other factors that cause desistance. Lowering external attribution, no matter the origin of the problem, should become a critical priority for postsecondary institutions in their efforts to increase student persistence. Positive outcomes following the practices that were employed in the online courses studied in this research should not be surprising, given the growth of information technology and the prolific number of social networking tools available to students and support staff. Concurrently, data from this research support the idea that the development of online programs at colleges should place focus on social and academic integration for guiding student motivation, as this has already led to successful outcomes in e-learning.

It is important to note that, in this research, academic incompatibility predicted one important measure of student persistence. This is attributed to students identifying problem areas, and using flexible, online, self-directed student support to work on the key points that caused the incompatibility, such as the pace of study and when tutoring was needed. Flexibility shows a commitment by the institution to the learning outcome desired by the student. Academic integration was another predictor for the degree of intent to enroll in the following semester. This

implies that academic interaction relevant to the desired outcome that links a student to an academic exchange is a major solution for student persistence. Instructors in the online learning environment must offer focused feedback on course assignments to increase academic integration. Deved e-learning as a new field may enhance student flexibility, cost and use of time. It can be concluded through this research that the college readiness courses offered as an alternative need to focus students toward achieving a higher level of performance through a basic network of teaching, self-directed learning and support.

Limitations

This study mainly focused on the relationship among student progress factors and student persistence by developing insights concerning the different variables that affect student persistence. The primary scope of this research was to investigate the relationships between various factors and student persistence, over which an institution typically has little control. Additionally, the subjects of this study were students who were also enrolled in on-ground courses at an Illinois community college. Therefore, caution should be used when desiring to attain conclusions about other types of students and institutions. However, it is possible that this study can provide a base for understanding what aspects may be generalizable to other online program students in other locations or to online students who have other values for their education across a variety of USHE contexts.

Recommendations

Educational achievement in USHE exhibits data consistently directed in a downward trajectory when looking at persistence. This is especially evident when compared with achievement levels in other countries. Our institutions are devoting many resources to deved, and despite this direction of resources, graduation rates at colleges and universities are far below

standards initially established by the Department of Education (NCES, 2014). Many students are leaving institutions without degrees, but with weighty debt. Research also shows that students located in concentrated poverty areas, regardless of race or ethnicity, are considerably disadvantaged (NCES, 2014). Offering readiness courses online and at a reduced rate could level the playing field, creating a paradigm where student learning and expected outcomes are congruent.

Conclusion

Due to the current explosion in online learning, there are ample opportunities for schools to promote an increase of academic instruction through e-learning, with over seventy-seven percent of USHE leaders rating learning outcomes for online courses as the same or superior to those for traditional, on-ground courses (Allen & Seaman, 2013). Current growth in USHE is online, it is less expensive to administer, and it could be a perfect educational space for the development of advanced and self-directed learners of all academic levels. With that prevalent mindset in place, the results for this study exhibited the effects of negative constructs associated with external attribution. What cannot be determined in this research is the positive effects of social integration. Furthermore, as with the majority of students in USHE, the vast majority of e-learning students have two or more obligations other than academics, such as work, family, and personal time, which constitute added external influences. These obstacles are leading indicators of persistence with respect to completing courses and program cycles. Based on the results of this study, lowering external attribution should be considered a proven, best practice in supporting students' determination to pursue educational goals.

Institutions that offer e-learning courses need to move from duplicates of the traditional, on-ground pedagogy in a search for new, innovative and outcomes-based approaches to teaching

and learning. Students should also be offered additional instruction, writing support and math tutoring at non-traditional time periods that mirror patterns of typical student usage of online resources. Institutions offering online instruction should be committed to providing necessary support to students as if they were on-ground enrolled in a traditional format.

Based on the data provided for this study, colleges with online education programs need to understand the how, what and why involved in each individual student's motivation for enrollment in a course of study. A comprehensive understanding of student motivation as it relates to a student's decision to persist is vital in order to understand how to create best practices in teaching and learning (Savage, 2010). It is determined that an increased focus of online course offerings, e-learning support programs and social media applications as tools used to integrate scholarly actions and learning could increase student success and persistence.

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APPENDIX A

Consent Form

CONSENT TO PARTICIPATE IN RESEARCH

Project Title: E-Learning and Massive Open Online Courses: Identifying Factors Contributing to Student Retention and Persistence in DevEd.

You are asked to participate in a research study conducted by Daniel W. Geiter, a doctoral candidate from the College of Education at Benedictine University, Lisle, Illinois. The results of this study will be contributed to the dissertation. You were selected as a possible participant in this study because you are a student taking DevEd courses at an Illinois Community College and over 18 years old. The topic of the study is related to course delivery through e-learning.

PURPOSE OF THE STUDY

The purpose of this study is to test Kember's Theory (1995) by relating persistence (independent variable) to predictive factors (dependent variable) for DevEd students enrolled in e-learning courses. This study evaluates and discusses student persistence in online e-learning environment, an emerging education delivery force. This study will investigate the relationships among student characteristics, student progress factors, associated with the student learning style, and student persistence in e-learning. The study intends to find how student progress factors, performance, and cost/benefit analysis, impact on student persistence. As discussed from various studies, it is critical to increase student persistence for the successful achievement for both institutions and students due to the higher numbers of dropout rate in e-learning than traditional classes. Yet not

sufficient results have been revealed on the solutions with various approaches such as student learning styles to deepen the effective factors.

PROCEDURES

As a volunteer participating in this study, you will be asked to do the following:

The survey consists of three sections. The first section will ask that you identify your background characteristics. This section includes eight questions. In this section, you will select, yes or no, and multiple choice questions. The second section is about your GPA in the courses and your intent to continue your education. This section contains eight questions. You are asked to choose among multiple choice questions. The last section is about your personal and work environment and perception. It includes 64 multiple choice questions. The total estimated time for this survey is approximately twelve minutes. If you decide to participate, please click on the survey link and you will be directed to the survey for the study.

POTENTIAL RISKS AND DISCOMFORTS

This study involves minimal risk.

POTENTIAL BENEFITS TO SUBJECTS AND TO SOCIETY

The results of this study may not directly impact on participants. Nevertheless, this study may affect not only future students involved in e-learning but may also affect future policy and efforts to understand student persistence and to improve retention rate.

PAYMENT FOR PARTICIPATION

There is no financial compensation for your participation in this research. There are no costs to you for enrollment in the *DevEd MOOC Suite* of courses as a result of your participation in this study.

CONFIDENTIALITY

Information obtained in connection with this study that can be used to identify you will remain confidential and will be disclosed only with your permission or as required by law. The results of this study may be published in a dissertation, scientific journals or presentations at professional conferences. Your privacy will be protected in all publications or presentations.

PARTICIPATION AND WITHDRAWAL

If you volunteer to participate in this study, you may withdraw at any time without consequences of any kind. Participation or non-participation will not affect your grade or academic standing at your educational institution. You may also refuse to answer any questions and still remain in the study. The investigator may withdraw you from this research if circumstances arise which in the opinion of the researcher warrant doing so.

IDENTIFICATION OF INVESTIGATORS

Questions or concerns regarding this research, should be directed to Daniel W. Geiter at (312) 268-5666 and Dr. Elijah G. Ward, faculty advisor who may be reached at (312) 268-5666.

RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You do not waive any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research subject, you may contact the Institutional Review Board at Benedictine University, 5700 College Rd., Lisle, IL, 60532, (630) 829-6000 or send email to: Dr. Sunil Chand, Program Director, schand@ben.edu.

SIGNATURE OF RESEARCH SUBJECT

I understand the procedures and conditions of my participation as described above. All questions have been answered to my satisfaction, and I agree to participate in this study.

Name of Subject

Signature of Subject

Date

STATEMENT and SIGNATURE OF INVESTIGATOR

In my judgment, the subject is voluntarily and knowingly giving informed consent and possesses the legal capacity to give informed consent for participation in this research study.

Signature of Investigator

Date

APPENDIX B

Survey

Section I: Student Characteristics

Instruction: Please select one response for each question that best describes your answer.

1. Gender

1. Male
2. Female

2. *Racial/Ethnic identity that best fits your self-description

1. White
2. African American
3. Hispanic
4. Multiple races
5. Other

3. *Age

1. 18-22
2. 23-over

4. *College affiliation

1. Community College
2. Private College/University
3. Public College/University

5. *Reason for return to school

1. Workforce Development
2. Academic Degree
3. Certificate Program

6. *Work Environment

1. Employed Full-Time
2. Employed Part-Time
3. Unemployed

7. *Relationship Status

1. Single
2. Married
3. Steady Relationship
4. Divorced/Separated

8. You have taken an online course before

1. No
2. Yes

9. Preferred learning style

1. Visual (pictures and images, graphs, charts, and diagrams)
2. Auditory (sound, music, and speech)
3. Reading/writing learner (printed words, reading, and writing)
4. Kinesthetic/physical (senses, body, and hands by touching and moving)

Section II: Student Performance, Cost-Benefit, and Persistence

10. *Current accumulated GPA range

1. 1.0-2.0
2. 2.1-3.0
3. 3.1-4.0

11. I weigh the pros and cons of the costs of staying in online courses.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

12. As I continue taking online courses, the cost is worth the effort.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

13. The benefits of continuing my online education outweigh the financial sacrifices made.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

14. I intend to enroll in online courses next semester.

1. No
2. Yes

15. Taking this course online saves me money.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

16. I intend to withdraw from my online courses next semester?

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

16b. Main reason of withdrawal for next semester.

1. Transfer 2. Graduation 3. Unsatisfactory Progress 4. Academic Failure 5. Financial Issues

Section III: Distance Education Student Progress (DESP) Inventory

Instruction: Please read the following statements and indicate the degree to which you agree with each statement using the following scale:

1. My significant other encouraged me to enroll in this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

2. My family encouraged me to enroll in this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

3. My employer encouraged me to enroll in this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

4. My friends encouraged me to enroll in this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

5. My employer was supportive while I was studying.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

6. My significant other offered support while I was studying.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

7. My coworkers encouraged me to study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

8. My family encouraged me to study because they thought the course was important.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

9. I usually spend a lot of time with my family.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

***10. I don't need the support of my family to succeed in this online course.**

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

11. The support of my family means a lot to me.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

12. When I work long hours it is difficult to find time to study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

13. Long hours at work leaves little time for study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

14. I seem to have so many other things to do there is never enough time for study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

15. A change in my employment left me without enough time for study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

16. A change to my work situation made it difficult to complete this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

17. I was ill during this online course, so found it difficult to keep up.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

18. Personal/family circumstances, unseen at the time of enrollment, hindered my studies.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

19. I prefer to spend time doing things other than studying.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

20. I have a busy social life.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

21. I went out a lot, rather than study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

22. My significant other became annoyed because I spent so much time studying.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

23. My children interfered with my studies.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

***24. I do not let anything interfere with my studies.**

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

25. My friends wanted me to go out rather than study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

26. I am very determined to finish this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

27. I often consider dropping out from this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

28. I often wonder whether all the study is worth the effort.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

29. I generally put a lot of effort into trying to understand things which seem difficult at first.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

30. I usually set out to understand thoroughly the meaning of what I am asked to read.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

31. When I'm tackling a new topic, I often ask myself questions about it which the new information should answer.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

32. I often find myself questioning things that I read in books or study materials.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

33. My main reason for doing this course is so that I can learn more about the subjects which really interest me.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

34. I find that studying academic topics can often be really exciting.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

35. I spend a good deal of my spare time in finding out more about interesting topics in this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

36. I find academic topics so interesting, I should like to continue with them after I finish this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

37. I found the study guide useful in preparing for this online course.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

38. The activities/self-assessment questions have helped me to learn.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

39. The study materials are easy to learn from.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

40. The Student Support comments on my assignments have helped me to study.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

41. The course was administered very efficiently.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

42. The Student Support service is useful.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

43. The email rapid response counseling service provided help when I needed it.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

***44. Online/email counseling is a waste of time.**

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

45. I use the online/email counseling service often.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

46. I enjoy reading so I am suited to online learning courses.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

47. I read other books as well as the study materials and set texts.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

48. I read widely.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

49. Instructors seem to delight in making the simple truth unnecessarily complicated.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

50. The best way for me to understand what technical terms mean is to remember the text book definitions.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

51. I find I have to concentrate on memorizing a good deal of what I have to learn.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

52. When I am reading I try to memorize important facts which may come in useful later.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

53. I usually don't have time to think about the implications of what I have read.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

54. Often I find I have read things without having a chance to really understand them.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

55. I suppose I am more interested in the degree I'll get than in this online course I'm taking.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

56. I chose the present course mainly to give me a chance of a really good job afterwards.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

57. I generally choose what I study more from the way it fits in with career plans than from my own interests.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

58. My main reason for doing this online course is that it will help me to get a better job.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

59. The learning materials are presented in a confusing way.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

60. I do not understand a lot of English words in the study materials.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

61. The type of work required by assignments is very different from what I expected.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

62. This online course is not run at the most suitable time of the year.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

63. The assignments are too difficult.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

64. The time allowed for completing this online course is too short.

1. Strongly Disagree 2. Disagree 3. Neither 4. Agree 5. Strongly Agree

APPENDIX C

DESP Copyright confirmation

Request approved.

Copyright Clearance Center

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APPENDIX D

Permission for Student Online Academic Persistence Survey

Approval received on 01/14/2015.

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