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Student Sucess and Retention : Critical Factors for Success in the Online Environment

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STUDENT SUCCESS AND RETENTION: CRITICAL FACTORS FOR SUCCESS IN

THE ONLINE ENVIRONMENT

by

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Abstract

This study was designed to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online courses as defined by final course grades. This study focused on two sets of variables. The first was regarding the relationship of student demographic and educational background factors such as age, gender, academic placement, educational level, enrollment status, grade point average, withdrawal history, and previous online course experience to success in online courses. The second was regarding the relationship of learning readiness factors of personal attributes, learning style, life factors, technical competency, technical knowledge, and reading rate to success in online courses.

The study analyzed data regarding students at a state college enrolled in online courses during a single term. Archival data from the readiness assessment SmarterMeasure Learning Readiness Indicator (previously named READI) results as well as demographic, end of course grades, and educational background data from available student records were collected for students registered in the selected sample sections. The SmarterMeasure Learning Readiness Indicator is a web-based, 122-item assessment intended to measure a learner's readiness for success in an online learning environment.

The statistical techniques of correlation and multiple regression analysis were used to analyze the relationship between the dependent variable of final course grade and the independent variables of student characteristics and readiness and to determine the predictive nature of the independent variables.

The findings of this study indicate that the age, academic placement, and GPA of students taking online courses may have a statistically significant relationship to their

final grade and so success in their courses. These findings regarding demographic and educational background variables suggest that a more mature, non-traditional student who has a higher GPA and did not place into remedial mathematics or English may have a stronger opportunity for success in the online environment. The findings regarding the second set of variables indicated that scores for students on the assessment scales of personal attributes, reading, technical knowledge and competency, and life factors also might have a relationship to their final grade in their online course. Although the predictive relationships were not strong, the findings regarding the assessment variables suggest that students who are better equipped and prepared in the readiness factors assessed may have slightly higher grades as well.

CHAPTER 1

INTRODUCTION

Online learning in higher education is at an all time high. New technologies and improved educational pedagogy have provided educators with ever increasing opportunities to develop high quality, effective, rigorous, and meaningful educational access to ever increasing numbers of students. This rise in online education offerings is an enormous benefit to students otherwise denied access due to lack of proximity to institutions of higher education or inability to attend classes during traditional schedules due to work or family obligations. The United States Distance Learning Associations (USDLA) *Distance learning: Enabling the Race to the Top* (2009) stated that for the 2006-2007 academic year, the U.S. Department of Education reported that an estimated 12.2 million learners registered in college-level credit-granting distance education courses. In the 2007 – 2008 academic year, approximately 760,000 post-baccalaureate students in postsecondary institutions were taking distance education courses. According Allen and Seaman, in the Sloan Consortium *Going the Distance* report (2011), "Over 6.1 million students were taking at least one online course during the fall 2010 term; an increase of 560,000 students over the number reported the previous year" (p. 8).

However, the quality of the online education offerings has been an ongoing concern, and research in this area has found conflicting results. The quality of online programs and courses must be monitored and maintained in order to ensure the integrity

of online education overall. The Higher Education Opportunity Act (HEOA, 2008)

requires that accrediting agencies or associations demonstrate that their standards

effectively address the quality of an institution's online education. The six regional

accrediting agencies, which oversee a range of institutions including community and state

colleges, universities, and for-profit colleges, have established standards in an attempt to

determine if colleges are using best practices to deliver online courses and programs

(Kelderman, 2011). These best practices include showing evidence that online faculty

members are appropriately trained and that student support services are sufficient. The

Sloan report (2011) indicates that regarding the learning outcomes of online education,

67% of academic leaders surveyed rated the outcomes as the same or superior to those

obtained through face-to-face instruction.

Although research in online learning has increased significantly in the last 10

years, much is still unknown regarding factors impacting student success and retention in

these virtual classrooms utilizing Internet learning management systems. Many questions

remain unanswered. One of these questions is what the critical factors are that ensure

student success and retention in the online environment. Three areas are evident as major

components of the discussion surrounding student success in online learning. First, how

does the online environment compare to traditional classrooms in success and retention?

Second, what role does course design and structure play in moving students toward

success? Third, do differing student demographics, personality and learning styles, and

other individual characteristics impact the likelihood of retention, success, and

satisfaction? This area of individual student learning with the goal of providing best

practice student support services is the focus of this study.

Context

Any discussion regarding distance learning must start at the beginning. From the advent of distance education in the late 1880's (Larreamendy-Joerns & Leinhardt, 2006), there have been concerns regarding the quality of the various methods and pedagogies used to deliver education to individuals unable to travel to or live near academies of learning. The first question that one can ask might be whether there is merit in providing education in the distance format, and, if so, what the areas of concern are that must be addressed to ensure an equal quality educational or learning experience as compared to or evaluated against the traditional educational or learning experience in the brick and mortar classroom? Larreamendy-Joerns and Leinhardt's (2006) argued in this review of the literature and history of distance education that the question of merit is answered by the need for distance education and specifically online programs to enable educators to reach the underserved populations for whom traditional educational offerings are not the best fit. This ability to access education from a distance has met the promise of continued democratization of the educational system. "By democratization we mean increasing either the access to higher education of populations that would be otherwise excluded, or increasing the range of people who might be served by elite institutions" (Larreamendy-Joerns & Leinhardt, 2006, p.568). The numbers of online programs and course offerings available and filled are indicative of the demand and attractiveness of online education for meeting this need.

So with the question of merit answered, the question of the quality and rigor of online versus traditional courses is the subject of continued discussion and disagreement in the educational arena. Findings in this area are mixed and complex. Studies

comparing student retention (course completion), student success (generally grades), and student satisfaction in online (both fully online and hybrid courses) versus traditional courses have generally found that student success and satisfaction in online courses have been equal to or greater than that found in traditional courses. Retention in online courses tends to be a continuing area of concern, however.

Carpenter, Brown, and Hickman (2004) researched asynchronous instruction compared to face-to-face instruction of developmental writing courses for community college students to address the concerns of higher education instructors and administrators regarding student outcomes. They found that online students were significantly more likely than face-to-face students to succeed in their courses with passing grades being the indicator of success. However, with regard to retention, face-to-face students were significantly more likely to finish their courses than were online students.

Hauck (2006) examined the differences between online and traditional classroom learning, as measured by final course grades, and student satisfaction in an introductory undergraduate course. They found no significant difference in grades between the online and traditional classroom. Likewise, the difference in student satisfaction was not significant.

However, recent studies from the Community College Research Center at Columbia University indicate that online course completion rates (with completion being defined as earning a D or better in the course) were 8 to 13 percentage points lower than face-to-face completion rates (Jaggers & Xu, 2010; Xu & Jaggers, 2011).

Studies of student retention have shown a more worrisome trend in the online environment. Moore, Bartkovich, Fetzner, and Ison (2003) performed an archival data study on student registrations in a community college setting. At first glance, their findings appear to show a significant difference in retention between online courses and campus-based courses with the online student retention consistently 5 to 8 percentage points lower than the campus counterparts. However, after analyzing only those campus courses that had matched online sections, the non-completion rates for online courses were only slightly higher than for the campus-based courses.

Although students do appear to enjoy the online learning environment, Yukselturk (2009) found that educational level, online learning readiness, and locus of control were the variables that appeared to be the strongest predictors of satisfaction for students in online courses. Similarly, Gunawardena, Linder-VanBerschot, LaPointe, and Rao (2010) found that learners' relative level of confidence and efficacy in working online were the best predictors of satisfaction. These findings indicated that student satisfaction could be impacted by the student's level of confidence or competence in specific online readiness variables. However, Menchaca and Bekele (2008) reported that a significant number of participants indicated that some face-to-face interaction was important to their success in online learning. So we find many institutions are using blended or hybrid courses to combine the best of both environments.

Tang and Byrne (2007) studied student satisfaction and course content acquisition in undergraduate courses offered online or in a blended environment versus regular instruction. They found that students were more satisfied in blended classes over strictly online or regular classroom formats. In the area of course content acquisition, the

findings were that students perform equally well in each delivery mode. Likewise, Xu and Jaggers (2011) found a higher completion rate in hybrid classes that compared more closely to face-to-face rates of completion than the fully online courses.

Although the findings in the literature and research appear to vary in support of online or blended instructional formats for learners' satisfaction and success, findings in the area of retention are a concern with online course retention being lower than in traditional courses. So although some of the literature supports the premise that online students are as successful and satisfied as traditional students, there is still a question of what individual factors and program practices have the greatest impact on success and retention.

Distance education in the form of online classes is here to stay at least for the foreseeable future. The numbers of students clamoring for and flocking to these courses indicate that they are much needed and fill a void for individuals unable or unwilling to travel to campuses for a variety of reasons. Although many students take online classes for convenience rather than necessity, some would not be able to continue their educational pursuits without the flexibility inherent in the online format, and still others simply choose to study and learn on their own terms in regard to place and time. This phenomenon is similar to the modern online banking and retail philosophy, as students choose to work at a "distance" even if that distance is simply across town or across the street. The question then is not if but how do we continue to provide these academic offerings so that student retention, success, and satisfaction are equivalent to if not higher than on campus offerings.

Although much of the research indicates that in the majority of programs and courses student success (as defined by course grades) and satisfaction are occurring in online courses at levels equal to or higher than in the brick and mortar counterparts, educators should continue to explore ways to improve learning outcomes through the use of new and innovative instructional design techniques, the use of emerging technologies, faculty preparation and training, and specific targeted online support services. New, more accessible technological advances are developed almost daily to support more effective communication and interaction between students and instructors, peers, and support services than ever before. The rapid rate of development in this area provides a wide range of opportunities for future research.

Also, several studies have been conducted regarding the individual characteristics of online students. The student characteristics studied vary considerably. Student satisfaction, retention, and success are all outcomes of interest in the field. Students entering college come with highly varied backgrounds and experiences. All of these factors have the potential for influence on students' ability to succeed in college and, specifically, in the online learning environment. The question of which student characteristics and behaviors have the most potential to impact student success and retention is one that calls for greater study. Through the identification of the characteristics and behaviors leading to success, targeted support services can be provided to increase the likelihood of completion of online courses and programs.

Purpose of the Study

The purpose of this study was to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online

courses as defined by final course grades. This study focused on the following research questions.

1. What is the relationship of student demographic and educational background factors such as age, gender, academic placement, educational level, enrollment status, grade point average, withdrawal history, and previous online course experience to success in online courses?

2. What is the relationship of learning readiness factors of personal attributes, learning style, life factors, technical competency, technical knowledge, and reading rate to success in online courses?

Methodology

The study analyzed data regarding students at a state college enrolled in online courses during a single term. Archival data from the readiness assessment SmarterMeasure Learning Readiness Indicator (previously named READI) results as well as demographic, end of course grades, and educational background data from available student records were collected for students registered in the selected sample sections. The SmarterMeasure Learning Readiness Indicator is a web-based, 122-item assessment intended to measure a learner's readiness for success in an online learning environment. The scales measured in the instrument are personal attributes (previously named individual attributes), learning styles, life factors, technical competency, technical knowledge, reading rate, and typing skills (SmarterMeasure, 2013a). All individually identifying student information were removed from data sources prior to receipt by the researcher and statistical analysis.

The statistical techniques of correlation and multiple regression analysis were used to analyze the relationship between the dependent variables of student success and the independent variables of student characteristics and readiness and to determine the predictive nature of the independent variables. Multiple regression was used to explain why some students are more or less likely to succeed in online courses, thereby offering educators valuable information for offering support services and interventions to learners (Huck, 2008).

Significance

As higher education institutions continue to grow the opportunities for access though online learning options, it is increasingly important to ensure that vulnerable, often isolated, student populations are provided the very best support efforts. Identifying the characteristics of the population of students participating in online learning is important to instructional designers (Morrison, Ross, & Kemp, 2003), faculty preparing to teach these students (Akyol et al., 2009; Cleveland-Innes, Garrison, & Kensil, 2007; Garrison & Akyol, 2009), and student services professionals supporting students for success in the online environment (Wojciechowski, 2005). Educators need increased knowledge of the individual student factors impacting success in online courses and programs. Identification of the demographic, cognitive, metacognitive, and behavioral factors required and possessed by students are the initial analyses necessary to identify the appropriate student support systems needed to assist students in the virtual environment. When these factors are identified, a model of support is required that will span the distance and engage students in the institution and course to ensure their initial and continued success.

Delimitations and Limitations

This study was delimited in several areas. Only one state college was studied. Sixteen sections of eight online courses were selected for the exploratory initiative utilizing the SmarterMeasure Learning Readiness Indicator during a single academic term. The courses selected were all deemed entry-level developmental or college credit courses. The variables gathered were from the limited data sources of those participants that completed the SmarterMeasure instrument during the exploratory initiative.

The study was characterized by certain limitations. The instrumentation used in this study, the SmarterMeasure Learning Readiness Indicator, has few published psychometric analysis results. Reports provided on the company website and doctoral dissertations indicated that the scale and subscale reliability may be inconsistent and require further study. The instrument is also self-report data. Self-report data can be contaminated through participants attempting to provide the answers that they believe would reflect a stronger response. Participants may also have different response styles or poor insight into their behavior or thinking (Johnson & Christensen, 2004). Other limitations will be discussed in Chapter 3.

Definition Of Key Terms

For the purposes of this study, operational definitions are provided for the following terms.

Distance Learning/Distance Education. Distance education is a formal educational process in which the majority of the instruction (interaction between students and instructors and among students) in a course occurs when students and instructors are not in the same place. Instruction may be synchronous or asynchronous (Southern

Association of Colleges and Schools [SACS], 2012). The state of Florida defines Distance Education courses as courses in which 80 percent or more of the seat time is not "face-to-face" (Florida State College at Jacksonville, 2013).

Hybrid or blended course. A hybrid course is a course that blends online and face-to-face delivery. A substantial portion of the content is delivered online (30 to 79%). Typically the course uses online discussions and has a reduced number of face-to-face meetings (Allen & Seaman, 2011). The Florida Distance Learning Task Force's Final Report (2009) defined hybrid or blended courses as courses in which at least 50% and not more than 79% of the direct instruction of the course is delivered utilizing some form of technology when the student and instructor are separated by time, space, or both. The state of Florida defined hybrid as 50 to 79 percent of the seat time for a course is not "face-to-face" (Florida State College at Jacksonville, 2013).

Online program and course. An online course is a course (or program) where most (80+%) of the content is delivered online. Typically these courses and programs have no face-to-face meetings (Allen & Seaman, 2011).

Self-Efficacy. Self-efficacy is one's belief in one's ability to succeed in specific situations or the measure of one's own ability to complete tasks and reach goals (Bandura, 1977; Luszczynska & Schwarzer, 2005).

Traditional/face-to-face instruction. A traditional classroom environment where the instructor and the students are not separated by geographic space or time.

Summary of Chapter 1

This chapter introduced the research topic, provided a context for the present study, the purpose of the study, research questions, methodology and setting, and the

study's overall significance and research contributions. Chapter 2 presents the literature on student readiness for college, readiness for online learning, readiness assessment and student characteristics that constituted the conceptual framework for this research. Chapter 3 examines the methodology of the study. A quantitative analysis of existing data sources was conducted to determine assessment score reliability and relationships between dependent and predictor variables.

Chapter 4 presents the data analysis and results of the study. This chapter is organized into five areas providing the results of the course characteristic review, assessment score reliability, descriptive statistics, and the results regarding research questions 1 and 2. Chapter 5 presents the summary, discussion and conclusions of the study.

CHAPTER 2

LITERATURE REVIEW

As the landscape of higher education is being transformed by the proliferation of online course offerings, the concerns regarding student success in the online environment grow exponentially with the increase in offerings. Institutions are eager to enter this lucrative market. However, as they provide greater access to students who are increasingly more in need of non-traditional educational engagement, it is more important than ever to be vigilant in assuring that students have every opportunity for success through quality programs, courses, and services. The ability of institutions to identify those factors that contribute to student success in the online environment is essential. Identifying the specific qualities of success in online program components and student characteristics is a key to assuring the educational success and experience for these students.

Comparison of online courses and programs to on-campus or traditional courses and programs has been the subject of much research in recent years (Anitsal, Anitsal, Barger, Fidan, & Allen, 2010; Cicco, 2009; Hsu & Shiue, 2005; Larson & Sung, 2009; Means, Toyama, Murphy, Bakia, & Jones, 2009; O'Neil & Fisher, 2008; Zavarella & Ignash, 2009). Comparisons between these instructional modalities increase understanding of the most effective components of each. It also is helpful to breakdown

these components into areas that educators have some hope of impacting in our efforts for improvement.

Three broad areas or categories appear to be appropriate for review when seeking to research online course and program quality. One area is course design and content (Larson & Sung, 2009; Means et al., 2009; O'Neil & Fisher, 2008; Zavarella & Ignash, 2009). Another area that has a major impact on success in online environment is instructor interaction, presence, and preparation (Garrison & Akyol, 2009). The final major area of focus in this field is the identification of readiness factors and the characteristics of the individual students undertaking online learning. It is the area of student readiness, individual characteristics, and support services that will be the primary focus of this literature review.

College Readiness

When discussing student readiness for learning, readiness for college in the broader frame is a logical starting point. Researchers have identified specific characteristics and skills that can be related to and are predictors of academic success and completion. These include previous academic preparation; cognitive skills; emotional intelligence; student engagement with the staff; faculty and peers (interpersonal competency); learning styles; motivation; persistence; self-efficacy; and self-regulatory skills (Boekaerts & Cascallar, 2006; Boekaerts, Pintrich, & Zeider, 2000; Chickering & Schlossberg, 1995; Conley, 2005, 2008; Hirsch, 2001; Kuh, 2007a, 2007b; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008; MacCann, Fogary, Zeidner, & Roberts, 2011; Pascarella & Terenzini, 2005, Zimmerman, 2002). The research on each of these specific factors provides insight into what knowledge and skills students need to be successful in college.

Conley (2008) defined college readiness as "the level of preparation a student needs in order to enroll and succeed – without remediation – in a credit-bearing general education course at a post secondary institution that offers a baccalaureate degree or transfer to a baccalaureate program" (p. 24). He identified four areas that outline a comprehensive conception of college readiness. These are key cognitive strategies, key content knowledge, academic behaviors, and contextual skills and knowledge. Cognitive strategies include cognitive and metacognitive capabilities such as analysis, interpretation, precision and accuracy, problem solving, and reasoning. Academic behaviors include time management, strategic study skills, and awareness of one's true performance and persistence, which require self-awareness, self-control, and intentionality. Contextual skills and awareness refer to the understanding of how college works as a system and culture. Using this model, Conley contended that few students are truly ready for college. It is not surprising then that only about a third of entering state college students can be expected to graduate in four years (Conley, 2005).

Kuh (2007a, 2007b) asserted that student engagement is a key factor in student success, satisfaction, and persistence. This engagement, and the subsequent positive outcomes, is the direct result of the time and energy that students expend on educationally purposeful activities. These activities positively influence students' grades and persistence. Through this engagement, students also develop strong learning habits that are accessible throughout their lifetime of continuous learning. High school graduates, however, do not necessarily enter college with the adequate skills for engagement and engaging in effective educational practices. Data from the High School Survey of Student Engagement (HSSSE) indicated that "almost half (47%) of high school

seniors study only three or fewer hours per week, well below the thirteen- to fourteen-hour-per-week average of first-year students at four-year colleges and universities." (Kuh, 2007b, p. 5) Furthermore, the National Survey of Student Engagement (NSSE) data indicate that students in their first year of college expect to spend more time studying than they actually do and thought they would do when they started college, resulting in a gap between expectations and behavior. First year students typically study less, write less, and read less than they expected. Kuh et al. (2008) concluded that "student engagement in educationally purposeful activities is positively related to academic outcomes as represented by first-year student grades and by persistence between the first and second year of college" and "engagement has a compensatory effect on first-year grades and persistence to the second year of college at the same institution" (p. 555).

Self-regulatory skills and motivation are particularly important for success in academic achievement. The concept of self-regulation has its origins in and has been studied through a variety of psychological perspectives. The social cognitive perspective views self-regulation as an interaction of personal, behavioral, and environmental triadic processes (Bandura, 1989). According to Zimmerman (2000), "self-regulation refers to self-generated thoughts, feeling, and actions that are planned and cyclically adapted to the attainment of personal goals" (p.14). In this approach to self-regulation, self-efficacy, a person's beliefs about the ability to structure and take the actions needed to be successful in attaining a goal, is key to providing the motivation for success. Zimmerman proposed a three-pronged feedback loop design of behavioral self-regulation, environmental self-regulation, and covert self-regulation. Each loop requires the learner to observe personal

behavior, environment, cognitive processes, and emotional states and make adjustments to conditions as necessary. The students' ability to monitor and control their behaviors, environment, and emotions determine how well they can make adjustments in their beliefs and learning strategies.

Online Readiness

Online or distance learners must possess the requisite college readiness components already discussed as well as some other specific skills for success in the online environment. The potential isolation of the online environment and the pull of outside influences such as work and family obligations on the time and energy of online students suggest that they must possess an autonomous, intrinsically motivated monitoring and regulation of their learning processes and techniques. Online students who possess stronger self-regulatory skills, greater motivation, and self-efficacy experience greater academic success and satisfaction (Artino, 2007, 2008, 2009; Artino & Stephens, 2009; Hsu & Shiue, 2005; Hu & Gramling, 2009; Tsai, 2009). Table 1 summarizes the findings of interest and the authors of the studies.

Artino's (2007) research involving Navy personnel found that "consistent with expectations, students' self reported task value, efficacy beliefs, and prior experience were significantly related to their overall satisfaction, perceived learning, and self-reported choice behaviors" (p. 197). Later research (Artino, 2008, 2009; Artino & Stephens, 2009) on self-regulation and motivation among Naval Academy undergraduates and their satisfaction with and success in online courses found that students who were most successful and satisfied with their online experience were more highly motivated and achieved greater academic success. Students who utilized the self-

regulating behaviors of "establishing a productive work environment and using resources effectively; organizing and rehearsing information to be learned; seeking help when they do not understand; and holding positive motivational beliefs about their capabilities, the value of learning and the factors that influence learning" (p. 39) were more likely to experience academic success and satisfaction in online settings.

Table 1

Research on Online Readiness

Self Regulatory Skills	
Establishing a productive work environment; using resources effectively; organizing and rehearsing information; seeking help.	Artino, 2008
Learner control; self-directed learning; time management; information management.	Hung, Chou, Chen, & Own, 2010
Metacognitive, cognitive, and resource management strategies.	Hu & Gramling, 2009
Self-monitoring, time management, and concentration.	Tsai & Tsai, 2003; Tsai, 2009

Motivation	
Holding motivational beliefs.	Artino, 2008, 2009; Artino & Stephens, 2009
Affective domain	Tsai, 2009

Self-efficacy	
Self-efficacy	Artino, 2007
Internet literacy	Tsai, 2009
Internet self-efficacy	Tsai & Tsai, 2003

Hung et al. (2010) asserted that two specific readiness dimensions related to self-regulation require special focus. They identified learner control and self-directed

learning. Students need assistance in establishing time-management and information management skills to make sure they have adequate time for class participation and course work

Metacognitive, cognitive, and resource management strategies were also found to be important self-regulated learning strategies for students in web-based courses (Hu & Gramling, 2009). The strategies perceived to be most helpful by these study participants were cognitive strategies and resource management strategies of goal setting/effort control/time management. Cognitive strategies included rereading, note-taking, and visualizing. Resource management strategies reported included time management, effort regulation, environment management, and help seeking.

Tsai and Tsai (2003) found evidence of the interplay between student's Internet self-efficacy and their online information searching and learning achievement. In researching students' information searching behaviors, the students' verbalizations during an information searching task were analyzed. These verbalizations were analyzed against their scores on a survey measuring Internet experience and self-efficacy. The findings of this study indicated that students with high Internet self-efficacy tended to have better online information searching strategies (control, trial and error, problem solving, purposeful thinking, and evaluating information) and tended to learn better from the task assigned. Tsai (2009) proposed the Model of Strategic e-Learning, based on previous research and experience, to describe student online learning from a metacognitive perspective. The model identified three domains of e-learning strategies needed for online learning success: perceived skill (comprehension, Internet skill, and self-awareness); affection (attitude, motivation, and anxiety); and self-regulation (self-

monitoring, time management, and concentration). The model further identified the e-learning environment needed for success as including flexible time and space; indirect social interactions; abundant information resources; and dynamic learning interfaces. Tsai's study identified motivation, self-monitoring, Internet literacy, Internet anxiety, and concentration subscales as the necessary components for online learning success and included these in the Online Learning Strategies Scale discussed later.

A student needs to possess and exhibit a combination of motivational, interpersonal, self-regulatory, and technological skills and behaviors to be successful in the online environment.

Readiness Assessment

One major field of research has focused on the assessment of the overall readiness or entry skills required of students to be successful in online courses. Some of the specific skills believed to be essential to online success, and so in need of being assessed for readiness, are identified in Table 2. As can be expected, early attempts to identify online readiness skills focused on computer and technology proficiency. Learning styles and personality traits were added later. Research has also identified self-regulated or self-directed learning skills and behaviors as significant factors for readiness.

Significant work on developing and testing readiness scales has been done to help guide students interested in online learning (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011; Hall, 2008, 2009; Hung et al., 2010; Kerr, Rynearson, & Kerr, 2006; McVay, 2000; Smith, Murphy, & Mahoney, 2003; Tsai, 2009). Some of these instruments focus on the technical skills required for online success, while others focused

on the personality and self-regulatory skills needed such as self-efficacy, goal setting,

planning, monitoring, and evaluating their own learning.

Table 2

Research on Readiness Assessments

Study/Assessment	Skills Assessed	Number of Items on Each Instrument
Hall, 2008, 2009/Is Online Learning Right for Me?	• need for course • community preference and behavior • completer behavior • self-help or help-seeking behavior • feedback preference • study time allocation • computer efficacy • reading efficacy • Internet efficacy • computer experience • mathematics efficacy • Internet access • oral or written communication preference.	16
Dray et al., 2011; Hall, 2008, 2009/ What Technical Skills Do I Need?	• computer and Internet access • Internet speed • email experience • Internet skills • file management skills • software and hardware knowledge • discussion board and chat knowledge • keyboarding skills.	15
Smith et al., 2003/McVay's Readiness for Online Learning	• Internet access • communication comfort • study time allocation • beliefs about online learning • self-efficacy • self-direction • self-discipline • time management • independence • goal setting	13
Hung et al., 2010/Online Learning Readiness Scale	• computer/Internet self-efficacy • self-directed learning • learner control • motivation for learning • online communication self-efficacy	26

(Table 2 Continues)

(Table 2 Continued)

Study/Assessment	Skills Assessed	Number of Items on Each Instrument
Kerr, Rynearson, & Kerr, 2006/Test of Online Learner Success	• computer skills • time management • motivation • academic skills (reading and writing) • need for online delivery • learning skills	50
Tsai, 2009/Online Learning Strategies Scale	• comprehension • Internet skill • self-awareness • attitude • motivation • anxiety • self-monitoring • time management • concentration	36
Dray et al., 2011/Online Learning Readiness Survey	• individuals' beliefs in their ability to complete a college degree, • beliefs about responsibility in problem solving (academic and technical) • self-efficacy in writing and expression • orientation to time and time management • behavior regulation for goal attainment • basic technology skills such as the ability to use email and the Internet • access to technology, such as devices and bandwidth • nature and frequency of technology use	96
Atanda Research, 2007; Guan-Raczkowski & McNulty, 2011; Hukle, 2008; Proffitt, 2008/ SmarterMeasure Learning Readiness Indicator	• individual attributes: time management, procrastination, persistence, academic attributes, locus of control, willingness to ask for help • learning styles: visual, verbal, social, solitary, physical, logical, and aural • life factors: time, place, reason, resources, skills • technical competency and knowledge • on-screen reading rate and recall • typing speed and accuracy	124

In studies of survey predictive validity, Hall (2008, 2009) found that the two

survey instruments, Is Online Learning Right for Me? and What Technical Skills Do I

Need?, each had low or little predictive value or validity. The Is Online Learning Right

for Me survey includes only 16 questions aimed at determining if students have the individual traits and skills necessary for success in online classes. The What Technical Skills Do I Need? survey contains only 15 questions aimed at determining if students have the computer self-efficacy beliefs necessary for success in online classes. Although the study found a low or little predictive value, these kinds of surveys may have value in raising awareness for potential online students regarding the skills and behaviors necessary for success in the online environment.

Smith et al. (2003) tested McVay's (2000) Readiness for Online Learning questionnaire for reliability and factor structure. Although they identified a strong factor structure with the two factors "comfort with e-learning" and "self-management of learning," they acknowledged issues with the instrument. Although the two-factor solution accounted for 48.5% of the variance, there was still 51.5% left unexplained. Five questions were identified that require further work to yield a better contribution to the reliability of scores on the instrument data. They concluded that the instrument could benefit from further revision and improvement.

Hung et al. (2010) expressed a belief that McVay's (2000) questionnaire lacked an emphasis on self-directed learning, motivation for learning, and learner control. In an effort to include these factors and the previously identified factors of computer and Internet self-efficacy and online communication self-efficacy, Hung et al. (2010) developed their version of the Online Learning Readiness Scale (OLRS). This study's purpose was to test the internal consistency and construct validity as well as confirming the factor structure. The five factors identified and tested were computer/Internet self-efficacy, self-directed learning, learner control, motivation for learning, and online

communication self-efficacy. All constructs displayed adequate reliability and

discriminant validity. The findings of this study indicated that "the OLRS provided by

the present study seems more comprehensive than the Readiness for Online Learning

questionnaire provided by Smith (2005) and Smith et al. (2003)" (p. 1086).

Another readiness measure, the Test of Online Learner Success (TOOLS), was

developed and tested by Kerr et al. (2006). The TOOLS instrument was developed to

assess those skills that institutions of higher education found to be necessary for online

student success. These skills or factors included computer literacy, technology usage,

communication skills, readiness, persistence, self-efficacy, learning styles, lifestyles, and

other student characteristics. Over the three-year study, Kerr et al. (2006) tested the

TOOLS instrument's structure and construct validity against a battery of surveys

assessing those behaviors found to be most prevalently identified by the online

community. The items initially identified for the TOOLS instrument were placed into the

six categories of computer skills, time management, motivation, academic skills (reading

and writing), the need for online delivery, and learning skills. In the multiple studies

conducted over three years, the researchers concluded that the TOOLS measurement of

online student success is a valid and reliable measure of online student success. Also,

they asserted that the instrument predicts various student outcomes such as end-of-course

grades and computer self-efficacy and the instrument can be used by instructors to

identify students' individual behavioral strengths and weaknesses regarding online

learning.

Tsai (2009) developed the Online Learning Strategies Scale (OLSS) as an

instrument to study student e-learning strategies to evaluate and provide feedback

regarding the previously discussed Model of Strategic e-Learning. The study identified

motivation, self-monitoring, Internet literacy, Internet anxiety, and concentration

subscales as the necessary components for online learning success and included these in

the OLSS. The final version of this instrument is composed of 20 items and is intended

to provide "researchers, system designers, curriculum developers, instructors and even

learners themselves with a diagnostic instrument for understanding the advantages and

disadvantages of online learning for students . . . scores can even serve as feedback that

can help online students to obtain greater self-awareness of their own online learning."

(p.46)

In another attempt to develop a useful, more rigorous, survey instrument, Dray et

al. (2011) produced the Online Learning Readiness Survey (OLRS). Their desire was to

"develop a more current instrument that combined learner characteristics and technology

capabilities and to employ a methodologically rigorous approach to the development of

the instrument." (p. 31). The learner characteristics subscale of the OLRS instrument

includes items regarding individuals' beliefs in their ability to complete a college degree,

beliefs about responsibility in problem solving (academic and technical), self-efficacy in

writing and expression, orientation to time and time management, and behavior

regulation for goal attainment. The technology capabilities subscale includes items

regarding basic technology skills such as the ability to use email and the Internet, as well

as access to technology, such as devices and bandwidth, and the nature and frequency of

technology use. The results of the validity study of the learner characteristics subscale

yielded strong translation and criterion-referenced validity for items from the learner

characteristics subscale. However, inconsistent results were obtained from the technical

capabilities subscale leading the developers to conduct further research and make revisions to this area based on the concept of engagement with information and communication technology versus simple access to technology. Further study regarding this area is needed and planned.

Another readiness tool used by a significant number of institutions is the SmarterMeasure Learning Readiness Indicator (previously called READI). The six components measured by this tool are similar to other surveys and questionnaires but appear to be more comprehensive, including more factors in this one instrument than found in those identified previously. The six components are individual attributes, learning styles, life factors, technical skills, on-screen reading rate and recall, and typing speed and accuracy. The individual attributes section measures time management, procrastination, persistence, academic attributes, locus of control, and willingness to ask for help. The life factors section quantifies variables in five areas: time, place, reason, resources, and skills. The learning styles inventory is based on a multiple intelligences model that measures the following seven learning styles: visual, verbal, social, solitary, physical, logical, and aural. The technical skills component is divided into two sections. Tasks assessed in the technical competency area are identifying a properly formatted email address, following a link on a web page, opening a file, identifying an appropriate software application for a specific task, downloading and listening to an audio file, working within a file structure, identifying an email attachment, saving a file, printing a file, and using a search engine. The technology knowledge section includes seven technology usage items that measure the degree to which the participant uses specified instructional technologies.

In a study of readiness factors for online education, Hukle (2008) found that of the variables measured by the READI instrument, the variables that contributed the most to predicting success as measured by grade point average (GPA) were individual attributes, reading comprehension, and logical learning style. When evaluating the relationship to the dependent variable of ACT scores, the predictor variables of reading comprehension, technical competency, and aural learning style presented the strongest predictive relationships. When a third dependent variable, online courses completed, was analyzed, verbal learning style, social learning style, and aural learning style indicated predictive relationships.

On the SmarterMeasure website, the following research and information regarding the assessment are provided:

In 2007 an external research firm (Atanda Research, 2007) was commissioned to analyze the data gathered during a study concerning the relationship of SmarterMeasure Learning Readiness Indicator (previously called READI) scores and measures of academic success and goodness of fit of distance education as a measure of construct validity. The major findings of this report were that there were forty-two statistically significant correlations between SmarterMeasure Learning Readiness Indicator variables and measures of academic success and goodness of fit. Of the five constructs measured by SmarterMeasure, the construct with the most correlation to academic success and goodness of fit was Individual Attributes. The variable of the participant's individual attributes scores were statistically significant at the .001 level with all measures of academic success and goodness of fit. The variable with the strongest correlation in the

study was relationship between Grade Point Average and Reading

Comprehension. (Atanda Research, 2007)

Following this research, Proffitt's (2008) dissertation replicated the Atanda research and reported even stronger correlations in 74 areas. Proffitt studied the relationship between learner readiness among online students as measured by this instrument and the dependent variables of academic success and learner perceptions of their goodness of fit with distance education. The researcher found that individual attributes correlated the strongest with the academic success factor of GPA. With regard to the independent variable of learner perceptions of the degree to which the student considered distance education a good fit for them, individual attributes, and social, aural, verbal, solitary, and logical learning styles yielded statistically significant positive correlations. "The construct of physical learning style yielded both negatively and statistically significant correlations with measure of perceived goodness of fit of distance education" (Proffitt, 2008, p. 85).

Proffitt's (2008) research found that there were several constructs measured with the READI assessment which yielded statistically significant relationships.

This research concluded that there is a very strong relationship between READI scores and academic success as measured by grade point average. Of the fifteen READI scores for which correlations were calculated with GPA, eleven of them were statistically significant at the .01 level. This indicates that these measurements of learner readiness for studying online do have a strong relationship with the grade point averages of students. The READI score which correlated the strongest with GPA was Individual Attributes. The three READI scores which did

not result in a statistically significant correlation with GPA were visual learning

style, social learning style, physical learning style, and aural learning style.

(Proffitt, 2008, p.69)

In 2007, DECADE Consulting, LLC conducted item reliability analysis of the

earlier version of the SmarterMeasure Learner Readiness Indicator assessment called

READI. Four sections of the assessment that were analyzed were Technical Knowledge,

Technical Competency, Individual Attributes, and Reading Competency. The data

related to Technical Knowledge, Individual Attributes, and Reading Competency were

more normally distributed than those for Technical Competency, which were skewed

toward a grade of 100 (Atanda Research, 2007). The Technical Competency section was

subsequently revised.

Other research and studies on the SmarterMeasure Learning Readiness Indicator

assessment include a study conducted by Middlesex Community College in Middletown,

Connecticut. In a correlation study, researchers found a significant correlation between

personal attributes and successful grades (Guan-Radzkowski & McNulty, 2011).

To answer whether SmarterMeasure scores affect students' grades in online

learning, a correlation study was conducted to see the relationships between the

scores of SmarterMeasure and the students' grades. The preliminary study done

in Spring 2009 and Summer 2009 on 750 cases showed a significant correlation

between the score of personal attributes and grades. They were significantly

correlated with a positive coefficient, meaning that the higher a score of personal

attributes, the higher grade a student would receive. This result implies that

personal attributes, represented by self-motivation, self-discipline, and time

management, plays a very important role in student success of online learning. This preliminary study was followed by a subsequent study Fall 2010 which analyzed grades on 3228 cases collected across six academic terms. The result confirmed a significant correlation between the score of personal attributes and students' grades. Middlesex Community College used these findings to modify the types of student services that they provide to online learners. This pattern of learner readiness assessment coupled with providing appropriate services to match their deficiencies resulted in substantial gains in student retention. Before SmarterMeasure was implemented, 6% to 13% more students failed online courses than students taking on-ground courses. After the implementation, the gaps were narrowed; 1.3% to 5.8% more online students failed than on-ground students. (SmarterServices, 2013c)

Similarly, J. Sargeant Reynolds Community College in Richmond, Virginia, found strong correlations between specific SmarterMeasure Learning Readiness Indicator sub-scales and students' academic success. As part of its reaccreditation review and Quality Enhancement Plan (QEP), they adopted the SmarterMeasure Learning Readiness Indicator. During an analysis conducted to determine the relationship between the SmarterMeasure Learning Readiness Indicator sub-scale scores and student's grades, the following results were found.

The top factors that demonstrate the highest correlation between SmarterMeasure performance and students' academic success are the following:

Skills - The results indicated that 66% of the students who scored Medium-High to High in the Skills factor succeeded in their online classes. By contrast, only

5% of students who scored Low-Medium in the Skills section were successful.

Time - Of those who scored Medium-High to High by demonstrating that they had an adequate resource of time, 62% were academically successful; only 10% of those who scored Low-Medium to Low were similarly successful.

Resources - The results indicated that 66% of the students who scored Medium-High to High in the Resources factor succeeded in their online classes, and only 5% of students who scored Low or Low-Medium in the Resources section were successful.

Place - Among those who scored Medium-High to High, 72% were successful in their online courses. (SmarterServices, 2013c)

The research indicates that there are definitive skills required for success in online learning and that these skills should and can be measured. The research further implies that these skills can be learned if students are found to be deficient in specific areas. Student's individual abilities to learn these skills and so be successful in online learning, however, maybe tied to even more discrete particular characteristics. The next section explores these particular characteristics.

Characteristics of Online Students

Are there other specific student demographics or characteristics that impact online student retention and success? As in traditional classrooms, information regarding student demographics and characteristics can provide insight into the factors that might influence successful completion of online courses. The question of which characteristics successful students in online courses possess has been the topic of several studies in recent years. Research in the area of student characteristics has included studies of a

variety of different factors and variables including demographics such as age, gender, ethnicity, educational level, academic standing and grade point average, enrollment status, financial status, and major to list a few. From this list of factors, organizing and categorizing of the many attributes would be helpful and provide structure to the continued review and discussion. Table 3 identifies several factors studied and the authors of the pertinent research.

Much of the literature on student success factors can be placed into three basic categories: demographic data; educational background, preparation and experience; and personal or life experience factors. Demographic data include age, ethnicity, and gender. Educational background, preparation, and experience factors include academic readiness as assessed by placement tests; full-time versus part-time enrollment; grade point averages; the number of credits a student has completed and previous online courses taken; and previous withdrawal history. Personal or life experience factors include students' ability to manage study space, time management skills, self-regulatory skills, whether students use financial aid to pay for college, and their learning styles or personality traits. Each of these categories and factors will be reviewed below.

Demographic Data

Exploring the relationship between student demographics and success, satisfaction, and retention could provide valuable information to educators. Understanding these relationships could allow educators to provide targeted interventions and programs to specific student populations.

Table 3

Research on Student Characteristics

Demographics	
Age	Aragon & Johnson, 2008; Barakzai & Fraser, 2005; Berenson, Boyles, & Weaver, 2008; Inan, Yukselturk, & Grant, 2009; Mykota & Duncan, 2007; Sutton & Nora, 2008; Wojciechowski, 2005; Yukselturk, 2009; Yukselturk & Bulut, 2007
Ethnicity	Aragon & Johnson, 2008; Carpenter et al., 2004; Kaifi, Mujtaba, & Williams, 2009; Moore et al., 2003
Gender	Aragon & Johnson, 2008; Barakzai & Fraser, 2005; Carpenter et al., 2004; Gefen, Geri, & Paravastu, 2007; Inan et al., 2009; Lawlor, 2006; Moore et al., 2003; Wojciechowski, 2005; Yukselturk, 2009; Yukselturk & Bulut, 2007

Educational Background, Preparation and Experience	
Academic readiness/placement	Aragon & Johnson, 2008; Carpenter et al., 2004; Wojciechowski, 2005
Educational level	Berenson et al., 2008; Kaifi et al., 2009; Sutton & Nora, 2008; Yukselturk, 2009
Student status	Inan et al., 2009; Sutton & Nora, 2008; Wojciechowski, 2005
Grade point average	Aragon & Johnson, 2008; Berenson et al., 2008; Hsu & Shiue, 2005; Wojciechowski, 2005
Withdrawal rates and previous withdrawal history	Carpenter et al., 2004; Moore et al., 2003; Wojciechowski, 2005
Credits taken/previous online courses/delivery system familiarity/prior experience with computers	Anitsal et al., 2010; Aragon & Johnson, 2008; Barakzai & Fraser, 2005; Berenson et al., 2008; Moore et al., 2003; Mykota & Duncan, 2007; Wojciechowski, 2005

(Table 3 Continues)

Personal or Life Experience Factors	
Personality	Battalio, 2009; Berenson et al., 2008; Lee & Lee, 2006; Lin & Overbaugh, 2007; Menchaca & Bekele, 2008; Yukselturk, 2009; Yukselturk & Bulut, 2007
Learning style	Cicco, 2009; Manochehri & Young, 2006; Mupinga, Nora, & Yaw, 2006; Papp, 2001; Rovai & Grooms, 2004; Sahin, 2008; Yukselturk & Bulut, 2007; Zhang, 2005

Age. The age of students enrolling in online classes could be an important factor in success rates. Online courses offer convenience, flexibility, and relative ease of access that traditional students (age 18-24) and adult students might find highly attractive. Students of all ages may have increased work and family obligations that make online classes appealing. The age factor studied in recent years has produced conflicting results. Berenson et al. (2008) found a correlation of age to increased emotional intelligence (EI), and EI is a strong predictor of GPA. Wojciechowski's (2005) study of predictors of success in online classes found that the older the student, the higher the grade in the course. However, a student's age did not show any significant impact on social presence, retention, success, or satisfaction (Barakzai & Fraser, 2005; Moore et al., 2003; Mykota & Duncan, 2007; Sutton & Nora, 2008; Yukselturk, 2009; Yukselturk & Bulut, 2007). There were also no differences in completion and dropout rates based on age (Aragon & Johnson, 2008; Inan et al., 2009).

Ethnicity. In the demographic of ethnicity, some studies indicate that white students appeared to be more successful in online courses (Carpenter et al., 2004). This may be due in part to their experience with and access to computers, as Moore et al. (2003) reported that 91% of white students stated that computer access was not a reason

for not successfully completing online classes, while 56% of black students said it was a very important reason for not completing. Kaifi et al. (2009) found a correlation between computer ownership and ethnicity for American Indian/Native American and the category "Other," with these ethnic categories reporting having fewer computers than did White and Black Americans. Hispanics were ranked in the middle of the group. In other studies of completion, ethnicity showed no significant association (Aragon & Johnson, 2008; Sutton & Nora, 2008).

     Gender. Gender is another student characteristic worthy of study. Gender has a mixed outcome in the research ranging from having no impact on academic success or satisfaction (Barakzai & Fraser, 2005; Inan et al., 2009; Moore et al., 2003; Wojciechowski, 2005; Yukselturk, 2009; Yukselturk & Bulut, 2007) to having some effect on other indicators of success or course communication (Aragon & Johnson, 2008; Carpenter et al., 2004). Female students have at times shown a greater success and retention rate than their male counterparts (Aragon & Johnson, 2008; Carpenter et al., 2004). Again, the convenience of taking online courses at home and at times convenient to working around family and other obligations maybe a stronger motivator for women. When women did withdraw, their reported reasons for withdrawal and lower participation rates were generally due to difficulty in finding a balance in work, family, and study responsibilities, while male students reported a lack of motivation (Lawlor, 2006; Moore et al., 2003). In another area of gender difference, women were more likely to reply to postings by other women (Gefen et al., 2007) and found promoting and maintaining relationships an important activity in their online courses (Lawlor, 2006).

Educational Background, Preparation and Experience

Educational background, preparation, and experience factors include academic readiness and placement, full-time versus part-time enrollment, grade point average, major or program of study, the number of credits a student has completed, orientation, previous online courses taken or familiarity with the delivery system, previous withdrawal history, semester or session format, and utilization of college resources (e.g., advising, library, tutoring, and technical support).

Academic readiness/placement. Studies including academic readiness, as assessed with college placement testing, have mixed results. Having a stronger academic readiness, as indicated on college placement tests, was a strong predictor of online success for some, with writing and mathematics placement as important predictors (Carpenter et al., 2004). Students with lower reading and writing scores also withdrew from online courses in higher proportions. Wojciechowski (2005) also found a statistically significant relationship between reading and English scores and final grades in online courses. However, there was no significant relationship found in writing scores and final grades in online courses. Aragon and Johnson (2008) saw no association of placement in developmental courses with completion and non-completion in online courses.

Enrollment status. Fulltime students were more likely to be retained (Carpenter et al., 2004). However, Moore et al. (2003) found that full time, first time in college students were less likely to succeed, while part time students had a higher success rate.

Grade Point Average. Aragon and Johnson (2008) showed, as could be expected, that completers of online classes had higher GPAs than non-completers. This

difference was significant but small. Others confirmed this finding with the independent

variable student GPA having a statistically significant relationship to the final grade

received or students' achievement in online classes and distance education (Hsu & Shiue,

2005; Wojciechowski, 2005). In the Berenson et al. (2008) study on emotional

intelligence (EI) as a predictor for online success, GPA, as a dependent variable, showed

a direct relationship to EI with students scoring higher on EI having higher GPA's. And

in this study, Berenson et al. found that EI was the primary predictor of academic success

in online courses. "Higher grades corresponded to greater levels of EI" (p. 11).

Previous educational and online course experience. Previous experience as

indicated by the number of cumulative credits and the number of online classes taken

would appear to be obvious factors for success in online success. It would be a natural

assumption that with greater experience in college and online courses, students would

gain the required skills for success. This was the case for students in the Moore et al.

(2003) study of community college students. They found that the fewer the higher

education credits completed by fulltime students, the less likely it was that they would

succeed in online courses. They also found that first time fulltime students were the least

likely to succeed in online courses and that the more experienced online learners were

more satisfied with their online courses. When they did withdraw, they listed academic

issues and personal problems as reasons, rather than problems with course delivery or

online format, as did the new online students (Moore et al., 2003).

Wojciechowski (2005) found that the more previous online courses a student

enrolled in, the better the grade they received in subsequent online courses. Aragon et al.

(2008) found that course completers were enrolled in more hours overall and in more

online courses than non-completers. And Berenson et al. (2008) found a significant

correlation between emotional intelligence and age, between age and the number of

semesters completed, and between age and the number of online courses completed.

These findings would be consistent with being in school for a longer period of time and

the accumulation of experience and credit.

With regard to prior computer experience in general, Menchaca and Bekele

(2008) reported that students and faculty indicated that a basic or moderate skill level in

information and communication technical proficiency is necessary for success in online

classes. In other studies, there appeared to be no effect on student achievement or

satisfaction (Barakzai & Fraser, 2005), but a statistically significant correlation was

found between the number of online courses taken and computer mediated

communication, showing an increase in social presence for students with greater amounts

of experience in online classes (Mykota & Duncan, 2007). The Mykota and Duncan

(2007) study did not, however, include any information on the correlation or predictive

power of social presence on success in online classes.

Withdrawal rates and previous withdrawal history. Withdrawal rates and

reasons for withdrawal from online and other college classes has been a point of

concentration in many studies of student success. Although there is consensus that a

withdrawal from a course is not a successful outcome, there is little consensus on the

causes and reasons for high withdrawal rates (Carpenter et al., 2004; Moore et al., 2003).

Carpenter et al. (2004) accurately contended that there is a distinct difference between

students who withdraw and those who stay but are not academically successful.

Students' reasons for withdrawal are often not related to the academic rigor or challenge

of the coursework attempted. Many external challenges and obligations can influence a student's decision to withdraw. However, the data still show a clear discrepancy in the number of withdrawals between online and face-to-face courses (Carpenter et al., 2004; Moore et al., 2003). Carpenter et al. (2004) found that online students had a greater withdrawal rate; however, those that completed courses online had a higher success rate. This could indicate that the higher withdrawal rate may have been impacted by the online mode of instruction. Moore et al. (2003) combined withdrawal (W) and failing (F) grades into a non-completion rate for their study, which made a firm conclusion regarding only withdrawals more difficult. Although this study reported a higher rate of non-completers in online courses, there was a generally good satisfaction rate with the overall online program at the point of dropout. With this somewhat conflicting data regarding the reasons for withdrawal, further research in this area would be necessary. Another study including previous course withdrawals as a variable for predicting success in online courses found this variable the third most significant in correlation to higher grades within the course (Wojciechowski, 2005). This indicates that a history of more withdrawals could have a negative correlation with future success.

Personal or Life Experience Factors

Personal or life experience factors include whether students work full or part-time, number and ages of children in the home, family history of attending college, financial aid used to pay for college, and learning styles or personality traits.

Personality. In studies of online students, some factors of personality are also found to have an impact on student success, satisfaction, and retention (Battalio, 2009; Berenson et al., 2008; Menchaca & Bekele, 2008; Yukselturk, 2009; Yukselturk & Bulut,

2007). Berenson et al. (2008) found relationships between emotional intelligence (EI), resilience, and personality traits and GPA. Online students who were characterized as sociable, as opposed to tense, reported higher GPAs. The overall implication made was that "soft skills like EI and certain predominant personality characteristics may be closely related to students' academic success in online courses" (p. 11). Others have reported that students must be motivated and not resistant to change (Menchaca & Bekele, 2008). Although Yukselturk (2009) found that locus of control was a factor in satisfaction, this variable was not included in predictions of success (Yukselturk & Bulut, 2007).

Lin and Overbaugh (2007) studied the impact of whether providing choice over chat versus threaded discussion boards was an important or effective strategy for increasing student learning and satisfaction. Interestingly, the design of this study allowed the researchers to investigate learning style impact, using introversion and extraversion as styles, as well as the impact of choice in student satisfaction and cognitive achievement. The authors found that extroversion and introversion had a small impact on a student's preference of using either chat or threaded discussion as a communication mode. Extroverts had a slightly higher preference for chat than did introverts. Although a majority of all students still preferred the threaded discussion, offering the option of chat may be worthwhile.

Lee and Lee (2006) found that extroverts posted more, while introverts' posts were more in-depth. This would indicate that extroverts may be more successful in online courses requiring increased numbers of discussion board assignments or requirements, while introverts may have more success in the quality of their posts and the in-depth nature of their posts and responses.

Learning Style. Studies of learning style have yielded similar conflicting results. Online students do not generally have any one specific learning style (Mupinga et al., 2006) that makes them more or less effective in the online environment. Like all students, it is rather the diversity of styles that teachers must be prepared to have expressed in their online environments that is the challenge. In some studies of learning styles among undergraduate and graduate students (Rovai & Grooms, 2004; Yukselturk & Bulut, 2007), no statistically significant differences in learning were found based on learning style. Others have found that different learning styles and learning style inventories yielded varying results in predictability of success and prevalence of particular student preferences in distance learning (Cicco, 2009; Papp, 2001). Another study using Kolb's Learning Style Inventory found the following:

> Web-based courses seem more appropriate for AC (abstract conceptualization) learners in terms of the perception of authentic and active learning. However, if web-based courses include more collaborative and real life activities, they can better accommodate learners with the preference of CE (concrete experience) and AE (active experimentation). (Sahin, 2008, p. 134)

> Zhang (2005) found that learning style was not found to be a statistically

significant factor in terms of distance learning receptivity, and Manochehri and Young (2006) found no difference in student learning or satisfaction in teaching methodology (traditional versus web-based courses) based on learning style.

The research on learning styles appears to indicate that the presentation of content and learning activities within online courses and students' awareness of their learning style preferences are factors that have greater relevance than the actual learning style of

individual students. Students that have the opportunity to identify their personal learning style and then are given a variety of learning activities that allow for learning style preferences and strengths to be utilized may be more satisfied and have greater success.

This review of the literature reveals a high degree of variety in the findings of studies on the impact of individual student characteristics on student success, satisfaction, and retention. College students enter or return to college with a plethora of individual attributes that must be acknowledged.

Theory of Action and Student Support Services

Readiness for success in college and online learning is an important component for higher education institutions to incorporate into student development plans for incoming students. Understanding the individual factors that influence retention, success, and satisfaction for online students will enable administrators to develop more effective development programs, communication processes, and support systems. Instructors and course developers benefit from this information through the ability to incorporate more choices to meet students' individual learning and communications styles and needs. A more thorough understanding of students' individual success characteristics may also enable institutions to provide ways of increasing course accessibility and flexibility.

For institutions that provide greater access through open enrollment policies and online options, it is imperative to provide the communication and development systems to support students who are new to the college and online environment. Communication structures, orientation, academic support services, student services, technical support services, sound andragogical course development, and faculty development and responsiveness are a few of the institutional best practices that can result from a clearer,

more comprehensive understanding of online student success characteristics, skills and

needs. Figure 1 identifies the potential factors and processes that lead to providing the

appropriate set of services and supports.
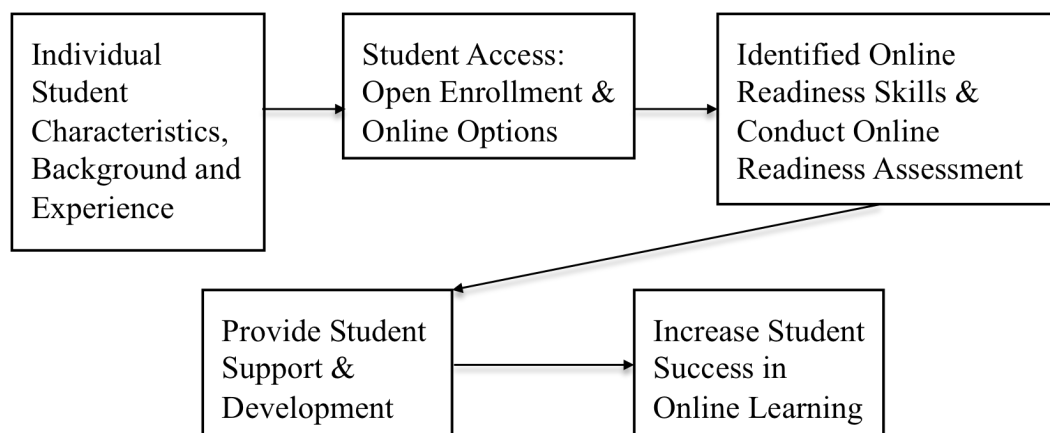
Figure 1. Model of the student characteristics, institutional factors, and readiness skills
leading to identification of appropriate student support resources.

Figure 2 provides a conceptual map of the best service practices identified in the

literature review above.

The following discussion includes information regarding the specific student

support service components in a concierge-type service model that could provide the

services needed by individual students utilizing technology that would identify needs and

interests based on student behaviors in the online classroom and student portal.

Communication

A comprehensive, effective, easily understood, and navigable online

communication environment is the first critically important component of providing

online support services to students. Too often, the online services provided to students

are complex, dispersed, and difficult to find and navigate. Institutions of higher

education utilize a variety of websites, student portals, social networks, and learning

management systems (McCracken, 2004, 2008). Finding and navigating through the
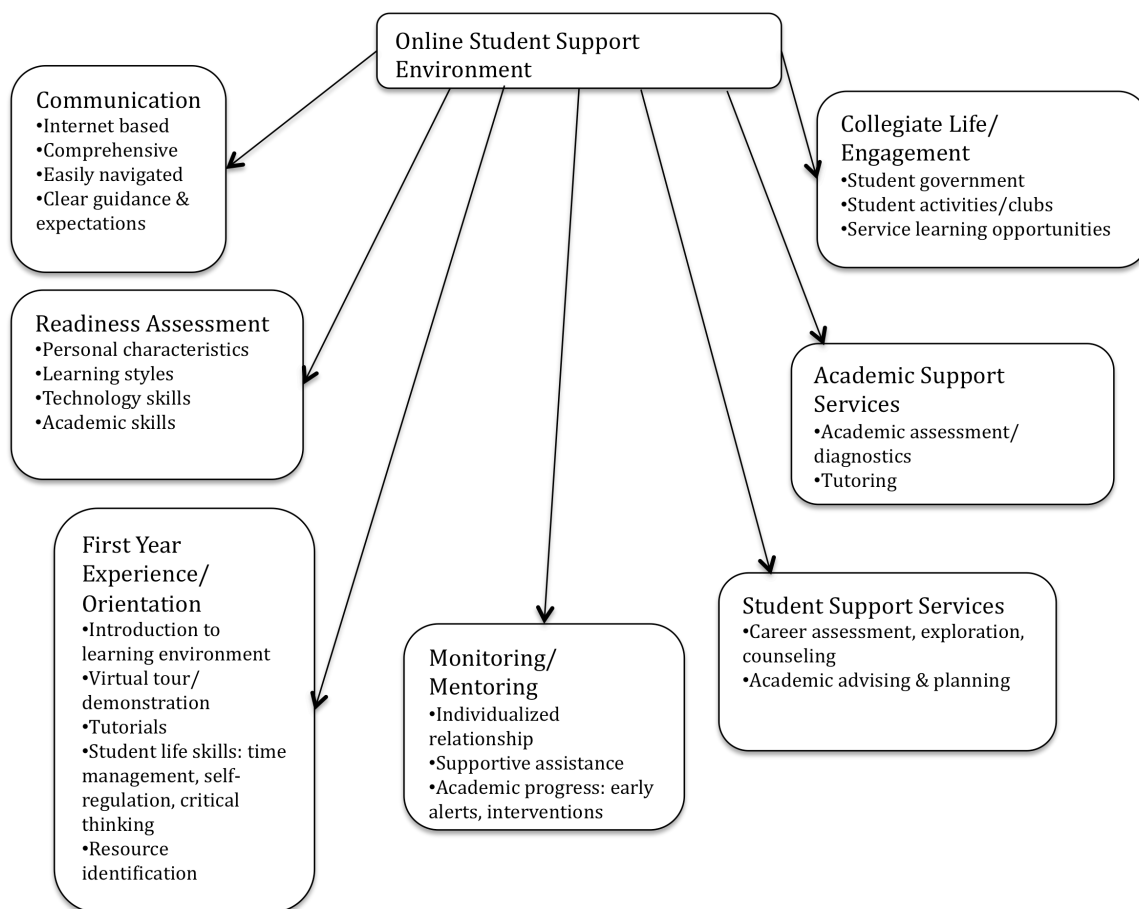
Figure 2. Conceptual map of required student support components for successful student achievement in the online learning environment.

variety of systems and logins can be a challenge to students trying to find answers to questions and to engage with the institution for business and support services.

From the onset of a student's relationship with an educational institution, there is a need to have an online environment or mechanism that communicates the practices, policies, procedures, and expectation of the institution. These necessary foundational communication components assure that students are aware of and prepared for the complex demands of the college environment and can have a significant impact on student achievement (Conley, 2008; Kuh et al., 2008). The business practices and the very culture of an institution are often exhibited through this initial communication engagement. The information components included in this important communication

structure include but are not limited to enrollment and registration, class offerings and schedules, finance and financial aid, academic grading and progress standards, student rights and responsibilities, student and academic resources, collegiate life, student engagement, and service opportunities. Information that is hidden in the depths of an online quagmire of information is often lost to the attention of students most in need of clear guidance and direction.

With the advent of social networking environments, it is now possible to reach out, communicate, and connect with others in the online environment in ever easier and engaging ways (Leece & Campbell, 2011; Paily, 2013). This potential for connection is not always taken advantage of in higher education. There is an underlying expectation and practice of connection and engagement in only face-to-face opportunities.

Orientation

The orientation or introduction to college life and online learning is a critical component in continuing to provide online students with the information required for success (Bambara, Harbour, Davies, & Athey, 2009). Many institutions are expanding the orientation period from before or during the first term to provide a more expansive first-year experience curriculum and support structure (Jessup-Anger, 2011; Kuh, 2007a). Students arrive at institutions of higher education from many different paths including first time in college directly from high school, students transferring from other schools, to adults returning to school after years in the work force.

The range of orientation or first-year experience options that institutions provide is wide. Some options for shorter, less time consuming offerings might include a short introduction to the online services and resources offered, a preview of the online course

environment and video tutorials of course navigation, and virtual access to advisors and tutors.

The first-year experience (FYE) programs offer the same early information listed above, but then carry forward the experience into courses offered during the first year such as student life skills (SLS) courses and workshops to help students engage with others and the institution. These opportunities provide a variety of learning activities focusing on self-regulation, time-management, critical thinking, resource identification, student activities, service learning, and more. As stated previously, these orientation and first-year experience courses are as beneficial for all students, in either online, face-to-face, or blended learning environments (Zeidenberg, Jenkins, & Calcagno, 2007). These courses should be developed to be offered in each of these modalities as well.

Another form of monitoring exists around a students performance against institutional expectations and standards of academic performance. A system of academic warning, probation, and suspension is often used for this monitoring. However, it is the intervention from the institution that has the strongest ability to be a factor in modifying student behavior and providing support that leads to increased success. Automated identification and reporting of course and term level student progress such as course grades, cumulative GPA, and withdrawal behavior is the first step in the identification process. With this identification, interventions such as workshops, advising, tutoring, and other student and academic services must be offered.

Another form of intervention and engagement is mentoring of online students. First-year experience programs or classes often provide an ongoing mentoring relationship to students. This extension of the relationship built during the initial contact

or course can be an important tether for students who may feel adrift and isolated from the institution (Bambara et al., 2009). Student peers, advisors, or faculty members can provide mentoring. Early identification of students that might need stronger mentoring could be provided through the readiness assessment, orientation interaction, or faculty early alerts and intervention recommended previously. However, mentoring requires a unique and individual relationship between the mentor and the student. For some students, this relationship could require considerable time resources. Utilizing virtual or online communication tools can help to ameliorate the impact of this required time commitment. Telephones, webcams, email, social networks, and texting can all be effective communication conduits or channels for mentor to mentee interaction. The level of engagement or interaction needed should dictate the appropriate communication tool, medium, or device.

Advising and Student Support Services

Advising services are another critical component and serve several purposes in higher education. In the online environment, the advising relationship and interaction are even more critical. The most obvious need may be the advising component of academic planning and course scheduling. But even before the academic planning can begin, students must have a clear idea or awareness of their career goals. McCracken (2004) recognized that few institutions offer "access to career development and transitional information specific to professional focus and geographic region" (p. 5). Often students begin programs of study without this basic knowledge. Education is and can be a place for exploration of career interests, opportunities, and options. However, the longer a student delays making the decision of career goals, the less likely they can set clear and

motivating academic goals. The structure of the current progress through higher education often requires that students identify their goals in order to select courses and paths that lead to the attainment of specific degrees focused on workforce skills and expertise. Although a more general arts and sciences degree is valuable and provides a strong foundation of knowledge and intellectual skill, many career paths require completion of degrees with specific knowledge and abilities as learning outcomes. For this reason, early decisions around career goals allow student to select appropriate programs, electives, or course work to move more efficiently through to meet educational goals.

Another benefit of providing advising resources is the continued engagement with the student in a more personal and caring relationship with the institution. Often, this advising relationship is another important touch point and motivational opportunity for student success and achievement. The same tools mentioned in the discussion of mentoring should be developed and utilized in advising interactions and interventions. Distance learning students or students that do not interact on-campus on a regular basis need this online or virtual access as much or more than other students. In the online environment, fewer interactions with faculty and peers may mean that students do not have the same access to information as their on-campus counterparts.

Academic Support Services

Offering academic services such as tutoring via an online or virtual option is also a critical component to student success for distance learners. Without the direct interaction of the face-to-face classroom, students can often hide their academic deficiencies more easily. This can lead to increased struggles, frustration, and lack of

success. Options for online tutoring services include vendors offering services via various platforms, use of course management system tools such as whiteboards, use of webcams, and other interactive web environments.

Online library and research resources abound in higher education today. Access to these resources can be offered easily to the full college community through a variety of research database hosts and resources. These resources are not inexpensive; however, access to the myriad offerings then are available to the whole student population.

Collegiate Life, Student Engagement, and Service Learning

One of the last frontiers of providing online students with equal access to educational resources for success in higher education is in the areas of collegiate life, student engagement, and service learning. Many online or virtual examples of communication portals, orientation, student services, and academic services can be found through Internet searches and in the literature. Many institutions have student portals that are built to enable students to register, conduct business, and view academic records. However, few of these offer the opportunities for engagement around the collegiate life, student activities, and service learning options. McCracken (2004) reported

> . . . experiences that have the potential to supplement intellectual development are
> also inaccessible, for instance: attendance at cultural, social, and athletic events …
> or participation in co-curricular activities, such as forensics events or performing
> arts … opportunities to be fully represented in the university community, such as
> access to university governance or grievance and other appeal processes, are
> invisible to distance students. Such experiences are not unavailable because
> technology can't support them, but rather because institutions don't prioritize

these types of experiences as contributing to the overall learning and academic development of students studying from a distance. (p. 5)

If holistic development of the student is the goal of higher education institutions, it is essential to provide online students not only the business, advising, and academic services offered on the ground but also the engagement, interactive, and development services of the co-curricular offerings with the collegiate life, student government, and service learning programming.

The need for identifying and providing the necessary support services to students attempting to meet educational goals through online leaning modalities is evident. The capacity, cost, and infrastructure to do so are factors that present challenges and barriers that institutions must overcome. There are many technology tools available for colleges and universities to utilize in providing all students the experiences and services that lead to educational growth and development. Student populations within higher education today are extremely heterogeneous. Identifying, developing, and providing appropriate supportive services via virtual or online environments is one way to meet the diverse needs of our student bodies.

Summary of Chapter 2

This chapter provided an overview of the literature related to student readiness for college and online learning, student individual characteristics, and the needed support services for success. The readiness factors for college and online learning were identified and discussed. Readiness assessments and individual factors impacting success were also reviewed. Finally, the support services recommended in the literature were discussed. The review of the literature provided in this chapter identify a strong need for further

research regarding the need for, development, and effectiveness of online student support services. Chapter 3 discusses the overall research design of this study. This discussion includes the research questions, research design, setting and participants, data sources, data analysis, and the research timeline.

CHAPTER 3

METHODOLOGY

This chapter discusses the methodology chosen to conduct this research study. Sections included in this chapter are research design, settings and participants, data sources, data analysis, ethical considerations, and the research timeline.

The purpose of this study was to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online courses as defined by final course grades. This study focused on the following research questions.

1. What is the relationship of student demographic and educational background factors such as age, gender, academic placement, educational level, enrollment status, grade point average, withdrawal history, and previous online course experience to success in online courses?

2. What is the relationship of learning readiness factors of personal attributes, learning style, life factors, technical competency, technical knowledge, and reading rate to success in online courses?

For this study, final course grades were used as the variable defining success in online courses. Instructor assigned final grades of A, B, C, D, F, FN (Failure for non-attendance). Students who withdrew from the initiative courses were removed from the correlation and multiple regression analysis. Although a grade of W (withdrawal) is not a

successful grade, the multitude of reasons for withdrawal could provide confounding factors for analyzing success characteristics.

Research Design

This retrospective, applied research study was undertaken in an attempt to identify and explain the relationships that exist between a student's lived experiences and personal characteristics and the success and completion of courses in the online learning environment. Understanding these relationships gives educational providers necessary knowledge to develop and implement support programs and structures to ensure greater student success in the online learning environment. Using deductive methods, this non-experimental research analyzed data on students' readiness, individual characteristics, and success in online courses as defined above. The data that were collected were suitable for the statistical analysis of correlation and multiple regression analysis.

Setting and Participants

The participants for this study were undergraduate college students from a large state college in the southeast United States. The students were enrolled in online sections of a variety of entry-level courses ranging from college preparatory mathematics, English, and reading to college level mathematics, English, natural science, and social and behavioral science. During the Fall term 2011, an exploratory initiative was conducted to assess the usefulness of a readiness assessment for students enrolled in selected online courses. The purpose of the initiative was to gain a better understanding of the readiness for online learning of students attending the state college. A sample of two course sections was randomly selected from course offerings of the following entry-level college preparatory and college level courses: ENC0025, Essentials in Writing II;

MAT0018, Basic Mathematics; MAT0028, Elementary Algebra; MAT1033, Intermediate

Algebra; REA0017, Critical Reading Strategies; ENC1101, English Composition I;

MAC1105, College Algebra; BSC1005, Life in Its Biological Environment; and

PSY1012, General Psychology.

Consideration of the class or course characteristics was important to the research

design for the present study. Online courses can vary considerably with regard to the

amount of interaction and how course material in presented. This variety of course

design, interaction, and presentation can be a confounding factor in research studying

relationships to student success. A review of the literature was conducted to identify the

course characteristics that impact student perceptions and rates of success. The course

characteristics identified included interaction among participants and the method of

providing course material or content (Dow, 2008; Liu, Magjuka, Bonk, & Lee, 2007;

Robinson & Hullinger, 2008). Although access to the full online courses was not

provided for the present study, a review of the course syllabi was conducted. The specific

items identified for the review are presented in Figure 3.

Method of Delivery

		Activity/Project	*Lecture/Text Material*
Level of Interaction	*High*	High Interaction Activity/Project	High Interaction Lecture/Text Materials
	Low	Low Interaction Activity/Project	Low Interaction Lecture/Text Materials

Figure 3. Method of delivery: activity/project or lecture/text material; level of interaction: high or low.

For the purpose of the syllabi review, interaction included personal assessment interactions and computer based instructional interactions. Personal assessment interactions included discussion boards; proctored quizzes and tests; individual or group projects; and peer reviews. Computer based instructional interactions included lab exercises, assignments, quizzes, and tests offered through an Internet-based instructional lab software program. Activity or project presentation was defined as being presented in two-way modality (e.g., lab exercises with feedback, project based exercises, small group projects or activities). Lecture or text course presentation was defined as being presented in one-way modality (e.g., PowerPoint Presentation, text only presentation). A review of all course syllabi for the initiative courses was conducted to determine the extent that the factors of interaction and course material presentation may present a new variable into the study. Findings for this review are presented in Chapter 4.

Faculty teaching these courses were asked to instruct students enrolled in these sections to complete the SmarterMeasure Readiness Assessment through an announcement in the online course or as a first assignment in the course orientation. The assessment was made available through the Blackboard Learning Management System course shells as a building block tool, which allowed the assessment to be included in the grade book and for points to be assigned for completion. A default of 10 points was assigned, however, each faculty member had the option to change this as deemed appropriate for the section. Participants who completed the assessment tool received a detailed report of their scores with explanatory notes and links to resources for support and information for development indicating areas for improvement. Participants were

also provided a link to resources provided by the college. Three hundred eighty students participated and completed 100% of the assessment (92% of assessment starts).

Data Sources

Archival data from the readiness assessment results as well as demographic, end of course grades, and educational background data from available student records were collected and merged for students registered in the selected sections. The demographic and educational background variables included in the statistical analysis were age, gender, academic placement (placement into reading, mathematics, or English remedial courses), enrollment status (credits attempted during term), educational level (cumulative credits), cumulative GPA, withdrawal history, and previous online course experience (credits attempted in online courses). All personally identifiable information was removed by the institutional research department from all data gathered prior to release to the researcher for data analysis for this study.

The term end date for the sections in the initiative was December 16, 2011. The final grades for the term were due on December 20, 2011. All archival data collection occured during the Fall term 2012.

The SmarterMeasure Learning Readiness Indicator is a web-based, 122-item assessment intended to measure a learner's readiness for success in an online learning environment. The assessment is intended to determine the degree to which a student possesses specific characteristics and attributes that have been found to have an impact on success in the online learning environment. The SmarterMeasure Learning Readiness Indicator assessment includes the following scales: individual attributes, learning styles,

technical skills and knowledge, life factors, reading rate and recall, and typing speed and accuracy (SmarterMeasure, 2013a).

Reliability refers to the consistency or stability of the scores reported using a assessment instrument (Johnson & Christensen, 2004). SmarterMeasure Learning Readiness Indicator reported that Applied Measurement Associates of Tuscaloosa, Alabama, was commissioned in 2011 to conduct reliability coefficient calculations for the SmarterMeasure Learning Readiness Indicator scores (SmarterMeasure, 2013b). The results of the study are presented in Table 4.

Table 4

SmarterMeasure Scale Score Reliabilities

Scale	Cronbach Alpha	Scale Scoring	Number of Items	Sample Size
Learning Styles	.81	0, 1,2	35	28,056
Individual Attributes	.80	1, 2, 3, 4	24	29,989
Life Factors	.76	1, 2, 3, 4	20	30,004
Technical Knowledge	.75	0, 1	23	29,992
Technical Competency	.38	0, 1	10	30,001

Note: Source: SmarterMeasure (2013b)

Reported scale reliability for scores on four of the five scales were within the acceptable internal consistency range of > .70. The technical competency scale fell well below this threshold.

Construct validity refers to the accuracy of the inferences, interpretations, or actions made on the basis of test scores (Johnson & Christensen, 2004). The SmarterMeasure Learning Readiness Indicator website reported,

In 2011 a major for-profit university conducted an extensive validity study to

determine if SmarterMeasure was being an accurate indicator of the student

success variables of academic achievement, engagement, satisfaction, and

retention. Statistically significant relationships were found between

SmarterMeasure scores and each of these four constructs. A summary of these

findings is provided below.

Academic Achievement and Retention were compared to SmarterMeasure scores

using grade and enrollment data.

- The measures of Individual Attributes, Technical Knowledge, and Life
  Factors had statistically significant mean differences with the measures of
  GPA.
- The measure of Learning Styles had a statistically significant mean difference
  between students who were retained and those who left. A 73% classification
  accuracy of this retention measure was achieved.
- The measures of Individual Attributes and Technical Knowledge were
  statistically significant predictors of retention as measured by the number of
  courses taken per term. (SmarterMeasure, 2013c)

The information provided on the SmarterMeasure website was limited in this area.

Data Analysis

For the present study, descriptive statistics, correlation coefficients, and multiple

regression analysis were used to provide valuable knowledge and replication of previous

studies regarding potential relationships, the strength of those relationships, and the

significance or non-significance of several predictor variables on student success in

online courses (Hair, Black, Babin & Anderson, 2010; Johnson & Christensen, 2004).

Item-level data were made available for analysis. The reliability coefficients for scores

on the assessment instrument were assessed with Cronbach's alpha measurement.

The dependent variable in the statistical analysis was the end of course grades assigned by faculty (A, B, C, D, F, FN, and I). A student receives a grade of FN at the instructor's discretion if they are failing the course due to non-attendance. This differs from the Non-attendance (NA) drop that instructors may initiate at the beginning of the term if a student never attends. The NA drop results in disenrollment from the course.

The independent variables in the statistical analysis were age, gender, academic placement, enrollment status, educational level, cumulative GPA, withdrawal history, and previous online course experience. Also included were the independent variables assessed in the SmarterMeasure Learning Readiness Indicator scales of life factors, personal attributes, learning styles, reading skills, technical knowledge, and technical competency.

Pearson product-moment correlation was used to measure the strength and direction of the relationship between the independent variables of student characteristics and readiness and the dependent variable of student success. Multiple regression analysis was conducted to analyze the relationship between the independent and dependent variables to determine the predictive nature of the independent variables. Multiple regression was used to explain why some students are more or less likely to succeed in online courses, thereby offering educators valuable information for offering support services and interventions to learners.

Delimitations and Limitations

This study was delimited in several areas. Only one state college was studied. Eighteen sections of nine online courses were selected for the initiative utilization of the

SmarterMeasure Learning Readiness Indicator during a single academic term. The courses selected were all deemed entry-level developmental or college credit courses. Five of the nine courses selected for the initiative were remedial level courses. Three remedial mathematics courses, one remedial English course, and one remedial reading course (two sections of each course) were included in the sample data. The variables gathered were from the limited data sources of those participants that completed the SmarterMeasure instrument during the initiative. Students taking online courses at other institutions and transferring these courses into the College cannot be identified in the present study within the variable online course experience.

The instrumentation used in this study, the SmarterMeasure Learning Readiness Indicator, has few published psychometric analysis results. Reports provided on the company website and doctoral dissertations indicated that the scale reliability may be inconsistent and requires further study. The instrument is also self-report data. Self-report data can be contaminated through participants attempting to provide the answers that they believe would reflect a stronger response. Participants may also have different response styles or poor insight into their behavior or thinking (Johnson & Christensen, 2004).

Protection of Human Subjects

Student-level data provided by the state college included non-identifiable, anonymous student data. The institutional research department gathered the archival data provided by the SmarterMeasure Learning Readiness Indicator results and from the state college records for the students that were included in the initiative utilizing the SmarterMeasure Learning Readiness Indicator assessment. The data were provided for

analysis without any personally identifiable information. A waiver for the protocol for this study was secured from the University of North Florida Institutional Review Board for the Protection of Human Subjects (Appendix A) and Florida State College at Jacksonville Institutional Review Board (Appendix B) prior to commencement of the study.

Summary of Chapter 3

The purpose of this study was to determine the predictive relationship of identified student demographic characteristics and readiness factors measured using an online readiness survey tool with measures of success in online courses. This chapter discussed the overall research design. This discussion included the research questions and epistemology, setting and participant selection, data sources, data analysis, research timeline, and ethical considerations.

Chapter 4 presents the data analysis and findings of the study. This includes scale reliability, descriptive statistics, correlation, and regression analysis and findings.

CHAPTER 4

DATA ANALYIS AND RESULTS

The purpose of this study was to determine the relationship between identified student characteristics, readiness factors, and measures of success in selected online courses as defined by final course grades. This study focused on the following research questions.

1. What is the relationship of student demographic and educational background factors such as age, gender, academic placement, educational level, enrollment status, grade point average, withdrawal history, and previous online course experience to success in online courses?

2. What is the relationship of learning readiness factors of personal attributes, learning style, life factors, technical competency, technical knowledge, and reading rate to success in online courses?

Chapter 4 provides a summary of the results of analyses conducted to address the research questions proposed for investigation. Methodology, descriptive statistics on the data gathered, and analyses relative to each of the research questions are presented. Discussion of the results will be presented in Chapter 5.

Course Characteristics Review Results

At the time of the present study, the College utilized a specific course design and instructional pedagogy to develop courses offered online. This program was established

to provide faculty with a consistent course template and students a consistent course experience. Adjunct faculty were required to use the college developed courses. Fulltime faculty had the option to use other course material. The present study included 18 sections of nine courses. Sixteen of the sections were taught using the college-developed courses.

Review of the syllabi was conducted to determine the number of personal assessment interactions and computer based instructional interactions occurring in each course section. Personal assessment interactions included discussion boards, proctored quizzes and tests, individual or group projects, and peer reviews. Computer-based instructional interactions included lab exercises, assignments, quizzes, and tests offered through an internet-based instructional lab software program. All course sections were presented in a two-way presentation and communication modality. Table 5 provides the results of this analysis.

The number of personal assessment interactions ranged from 1 to 53 with a mean of 18 (SD 16). The number of computer based instructional interactions ranged from 0 to 16 with a mean of 8 (SD 6.4). The two course sections taught with the largest number of personal assessment interactions (53) had student course grade means of 2.37 (SD 1.33) and 1.74. (SD 1.48). The student course grade means ranged from 1.50 (SD 1.63) to 3.52 (SD .77). Analysis found that there was no statistically significant correlation between assessment interactions or computer based interactions and course grade class means (r (18) = .209, p = .405 and r (18) = -.296, p = .233, respectively). For this reason, this variable was not included for further analysis in the present study.

Table 5

Course Characteristics Information and Descriptive Statistics

Course/Section	Number of Assessment Interactions	Number of Computer Based Instructional Interactions	Student Course Grade M	Student Course Grade SD
BSC1005/1 (A, CDC)	53	0	2.37	1.33
BSC1005/2 (A, CDC)	53	0	1.74	1.48
ENC0025/1 (FT, CDC)	20	12	2.60	1.40
ENC0025/2 (A, CDC)	20	12	1.83	1.46
ENC1101/1 (A, CDC)	20	0	2.70	1.52
ENC1101/2 (FT)	14	0	2.19	1.60
MAT0018/1 (A, CDC)	8	16	1.59	1.42
MAT0018/2 (A, CDC)	8	16	2.77	1.36
MAT0028/1 (A, CDC)	2	16	1.68	1.67
MAT0028/2 (A, CDC)	1	16	2.28	1.41
MAT1033/1 (A, CDC)	3	8	1.50	1.63
MAT1033/2 (A, CDC)	3	8	1.86	1.59
MAC1105/1 (A, CDC)	13	12	2.38	1.75
MAC1105/2 (FT)	1	12	3.04	1.26
PSY1012/1 (A, CDC)	30	0	3.27	1.41
PSY1012/2 (A, CDC)	30	0	3.52	.77
REA0017/1 (A, CDC)	24	9	2.69	1.75
REA0017/2 (A, CDC)	24	9	2.93	1.44

Note: A = adjunct faculty; FT = fulltime faculty; CDC = college-developed course.

Sixteen different faculty members taught the 18 sections included in the present study. Two adjunct instructors taught two sections each. Fourteen (88%) instructors were adjunct faculty, two were fulltime faculty. All adjunct faculty used the college developed courses and both fulltime faculty used their own course materials. One fulltime professor had the lowest number of assessment interactions (1) and 12 computer based instruction interactions with a student course grade mean of 3.04 (SD 1.26). The other fulltime professor had 14 assessment interactions and with a student course grade mean of 2.60 (SD 1.40).

Although no statistically significant correlation was found in the analysis conducted in the present study, this is a critically important area for review and should be the focus of future investigation and research. A more comprehensive review of course content, interactions, and success variables would benefit the online educational community.

SmarterMeasure Assessment Scale Reliability

The participants for this study were undergraduate college students from a large state college in the southeast United States. The students were enrolled in online sections of a variety of entry-level courses ranging from college preparatory mathematics, English, and reading to college level English, mathematics, natural science, and social and behavioral science. During the Fall term 2011, an exploratory initiative was conducted to assess the usefulness of a readiness assessment for students enrolled in selected online courses. A sample of two course sections was randomly selected from course offerings for the eight entry-level college preparatory and college level courses. Archival data from the readiness assessment results as well as demographic data, end of

course grades, and educational background data from available student records were collected and merged for students registered in the selected sections. Three hundred ninety-eight students participated and completed 100% of the assessment. Of these, 347 students remained in the courses through a drop/add period, and demographic and educational background variables were gathered for these students.

The statistical analyses conducted for the gathered data include reliability analysis, correlations, and multiple regressions. The specific analytic methods and findings for each analysis are described and reported in detail.

The SmarterMeasure Learning Readiness Indicator is a web-based, 122-item assessment intended to measure a learner's readiness for success in an online learning environment. The SmarterMeasure Learning Readiness Indicator assessment includes the following components: personal attributes (previously named individual attributes), learning styles, technical competency and knowledge, life factors, reading rate and recall, and typing speed and accuracy (SmarterMeasure, 2013a). Personal attributes, learning styles, technical competency and knowledge, life factors, and reading scores were included in statistical analysis for this study. Typing speed and accuracy were excluded for analysis because these variables were not found to be a focus in the literature reviewed. Access to a test manual, test questions, responses, and scoring methodology was not made available for the SmarterMeasure assessment tool. In the absence of this information, I reviewed the item level data provided by the developer and determined the scale, subscale, number of items, scale scoring type, and possible points data required for the present study. Table 6 provides this detailed information for the SmarterMeasure assessment version used in the present study. Individual response scores for each

question were used in item reliability testing. Percentage correct scores for each scale were used in correlation and regression testing.

Hair et al. (2010) stated that "reliability is an assessment of the degree of consistency between multiple measurements of a variable" (p. 125). Analysis of the item responses on the SmarterMeasure Assessment for the sample for this study was conducted and internal consistency reliability coefficients were calculated for scores on each scale. It is important to perform internal consistency reliability tests for specific samples because

> reliability is not an attribute of an instrument but is an attribute of scores.
> Because every sample yields a unique set of scores for a particular instrument, and because every set of scores reveals a unique internal consistency reliability coefficient to a specific number of decimal places, it cannot be assumed that every set of scores will yield equal or even similar internal reliability coefficients. (Onwuegbuzie & Daniel, 2002, p. 91)

Three hundred ninety-eight students initially enrolled in the initiative courses completed the SmarterMeasure assessment. Cronbach's alpha reliability coefficients were utilized. Cronbach alphas (α) for the scales scores for learning styles, technical knowledge, and life factors scales were .83, .79, and .75, respectively, indicating that the scores on these scales had acceptable internal consistency above the generally agreed upon lower limit of .70 (Hair et al., 2010). Scale means were 44.37 (SD = 9.32) for learning styles, 59.35 (SD = 10.39) for technical knowledge, and 77.41 (SD = 9.47) for life factors.

Table 6

SmarterMeasure Scale and Subscale Information

Scales/Subscales	Number of Items (Scale/Subscale)		Scale Scoring Type	Possible Points
Life Factors	20		1, 2, 3, 4, 5	100
• Reason		4		20
• Place		4		20
• Resources		4		20
• Time		4		20
• Skills		4		20
Personal Attributes	24		1, 2, 3, 4	96
• Help Seeking		4		16
• Time Management		4		16
• Procrastination		4		16
• Locus of Control		4		16
• Persistence		4		16
• Academic Attributes		4		16
Learning Styles	35		0, 1, 2	70
• Solitary		5		10
• Logical		5		10
• Aural		5		10
• Verbal		5		10
• Social		5		10
• Physical		5		10
• Visual		5		10
Reading Skills	10		True/False	100
• Reading Rate				
• On Screen Reading Recall				10 each
Technical Competence	10		0, 10	100
• Computer Competence		5		50/10 each
• Internet Competence		5		50/10 each
Technical Knowledge	23			64
• Technical Usage		7	0, 1, 2, 3	21
• Technology in Your Life		2	1 – 10	20
• Technology Vocabulary		10	0, 1	10
• Personal Computer/ Internet Specification		4	Variable	13

Cronbach alphas for scores on the reading, personal attributes, and technical competency scales were .55, .51, and .38, respectively, indicating that these scores did not have acceptable internal consistency levels. Scale means were 7.15 (SD = 1.85) for reading, 73.19 (SD = 5.46) for personal attributes, and 93.37 (SD = 9.33) for technical competency. Table 7 provides the scale analysis results for all SmarterMeasure Assessment scales.

Table 7

Reliability Data for Scale Scores on the SmarterMeasure Instrument

Scale Variable	α	n items	Mean	SD
Learning Styles	.83	35	44.37	9.32
Technical Knowledge	.79	23	59.35	10.39
Life Factors	.75	20	77.41	9.47
Reading	.55	10	7.15	1.85
Personal Attributes	.51	24	73.19	5.46
Technical Competency	.38	10	93.37	9.33

Note: n = 347. Personal attributes scale: 1 = *Not like me at all*; 2 = *Not much like me*; 3 = *Somewhat like me*; 4 = *Very much like me.* Personal attributes items 3, 5, 13, 14, 15, 16, 17, and 22 are reverse scored.

The Cronbach alphas differ somewhat from those reported by SmarterMeasure as reported in Chapter 3 (Table 4).

As stated previously, reliability estimates are sample dependent and can be affected by several different factors. Onwuegbuzie and Daniel (2002) reported that test length, scores spread, test difficulty, test taker ability, variables measured, and effect

error are some factors that may impact reliability score variance from one sample to another.

Although differences in the sample demographics between the SmarterMeasures reported reliabilities and those of the sample included in this study could explain some of these differences, the descriptive statistics do not appear to provide evidence that sample differences explain the lower reliability found in the present study. The SmarterMeasure *2012 Online Student Readiness Report* (SmarterMeasure, 2013a) provided demographic variables of 70% female, 35% traditional age (18 - 24), and 45% had previously taken an online course. Corresponding demographic information for the present sample were not appreciably different, as will be described later in this chapter. Additional demographic data were not available for comparison.

As previous research reported in the literature indicates, the constructs of personal motivation, self-regulation, and time management are important factors for student satisfaction and success in the online learning environment (Artino, 2007, 2008, 2009; Artino & Stephens, 2009; Hsu & Shiue, 2005; Hu & Gramling, 2009; Tsai, 2009). The SmarterMeasure Readiness Indicator purports to assess these characteristics in the personal attributes scale. The ability to assess a student's skills in these areas would be very valuable information for student self-awareness, faculty support, and institutional intervention. However, the low reliability findings in this study are troubling. In the analysis of the personal attributes reliability, the Cronbach's alpha did not improve with the removal of any one item (see Table 8).

Table 8

Personal Attributes Cronbach's Alpha if Item Removed

	Cronbach's Alpha if Item Deleted
Q1	.488
Q2	.484
Q3	.562
Q4	.492
Q5	.553
Q6	.480
Q7	.489
Q8	.491
Q9	.474
Q10	.493
Q11	.497
Q12	.477
Q13	.541
Q14	.511
Q15	.489
Q16	.555
Q17	.490
Q18	.548
Q19	.487
Q20	.479
Q21	.488
Q22	.520
Q23	.507
Q24	.483

Because the literature indicated that various personal characteristics and skills are important for student success and in an effort to better understand the low reliability estimates for scale scores with the present sample, further investigation of the subscales of help seeking, time management, procrastination, persistence, locus of control, and academic attributes was conducted.

First, Cronbach's alpha reliability coefficient analysis was run for scores on the full set of personal attributes items while successfully removing the 4 items for each subscale to determine if removing any one subscale improved overall reliability. The results with each subscale removed are provided in Table 9. The removal of the procrastination items (3, 4, 16, and 21) resulted in a Cronbach's alpha of .56. The removal of the persistence items (6, 13, 18, and 23) resulted in a Cronbach's alpha of .55. These were only very slight increases in Cronbach alphas. Removal of the items for time management, help seeking, locus of control, and academic attributes each reduced the overall Cronbach alphas. In this instance, removing items to improve reliability would not be possible because of the small number of items.

Table 9

Item Reliability After Subscale Items Removed

Personal Attributes Subscale Removed	α
Without Help Seeking	.44
Without Time Management	.38
Without Procrastination	.56
Without Locus of Control	.49
Without Persistence	.55
Without Academic Attributes	.40

Cronbach's alpha reliability coefficient analysis on scores for each subscale was also run to determine if any of the subscale scores were more or less reliable individually. Table 10 reports the details of this additional subscale reliability analysis. Although the time management subscale scores were close to the acceptable level of internal consistency (i.e., .70), the results of the majority of the subscales were below acceptable levels of internal consistency and so did not yield any information contrary to the original reliability findings. Only 4 items are included in each subscale, however, and so this also contributed to the low levels of reliability. The subscales procrastination, locus of control, and persistence resulted in negative alpha levels. These subscales included reversed scored questions that can result in negative alpha scores. Review of the items revealed that the items were scored and coded correctly. The negative alphas may indicate a high level of error variance or correlation error (Nichols, 1999; Teo & Fan, 2013). The negative results could also be due to how the respondents interpreted the item.

The item reliability estimates resulted in less than optimal levels for 3 of the 6 scales of the SmarterMeasure Readiness Assessment for the study sample data. This finding is problematic for the ongoing analysis of these variables for the current study. For this reason, two regression analyses were conducted for these variables. The first included all six variables and the second included only those variables that displayed acceptable reliability levels.

Table 10

Item Analysis Data for Personal Attributes Subscales

Subscale	α	Mean	SD
Help Seeking	.32	13.38	1.63
Q1		3.57	.66
Q15		3.21	.70
Q19		3.66	.62
Q22		2.93	.85
Time Management	.65	14.14	1.86
Q2		3.54	.65
Q7		3.45	.69
Q9		3.47	.75
Q12		3.69	.55
Procrastination	-.29	10.58	1.49
Q3		2.16	.89
Q4		3.16	.83
Q16		1.79	.83
Q21		3.47	.73
Locus of Control	-.14	9.46	1.57
Q5		1.82	.90
Q14		2.28	1.03
Q17		1.64	.76
Q24		3.71	.51
Persistence	-.41	11.27	1.63
Q6		3.64	.59
Q13		2.35	1.03
Q18		2.43	1.09
Q23		2.85	.94
Academic Attributes	.37	13.36	1.86
Q8		3.09	1.08
Q10		3.08	.74
Q11		3.84	.43
Q20		3.35	.77

Descriptive Statistics

Three hundred forty-seven students completed the SmarterMeasure assessment and initiative courses with final grades assigned. Percentage scores were used for the six scales included in this analysis. Percentage scores were provided on the score report from SmarterMeasure and were calculated by dividing the actual score by the maximum score possible. Table 11 reports the descriptive statistics for the SmarterMeasure percentages assigned to these completers.

SmarterMeasure Assessment Variables

The mean percentage scores for all variables except technical competency were within the range of 64% to 79%. The technical competency mean of 92% (SD = 9.95) would indicate that students in the present study displayed very high ability in this area. The high standard deviations of all variables indicate that the scores exhibited a wide variance across the sample with the greatest variance in the reading scale.

Table 11

SmarterMeasure Scores Descriptive Statistics

	Minimum Percentage	Maximum Percentage	Mean Percentage	SD
Learning Styles	28.57	100.00	63.87	13.31
Personal Attributes	51.04	94.79	79.29	7.75
Reading	0.00	100.00	71.84	18.51
Technical Knowledge	37.50	96.88	72.15	10.95
Technical Competency	20.00	100.00	92.80	9.95
Life Factors	47.00	96.00	77.97	9.39

Demographics and Education Background Variables

The demographic and educational background variables included in the statistical analysis were age, gender, academic placement (placement into reading, mathematics, or English remedial courses), enrollment status (credits attempted during term), educational level (cumulative credits), cumulative GPA, withdrawal history, and previous online course experience (credits attempted in online courses). The dichotomous variables, gender and academic placement, were coded for analysis. Gender was coded as 1 = female and 2 = male. For the variables of academic placement (placement into reading, mathematics, or English remedial courses) each subject area was coded as either 0 = not placed or 1 = placed into subject remediation.

A preliminary examination of the predictor variables for 347 completers indicated some areas of interest for further investigation. Age and the nature of the course were of particular concern because older students and remedial students were thought to present greater challenges for success in online courses.

The completers' ages ranged from 17 to 56, with a mean of 28 years (SD = 8.67). Review of two age ranges, under 25 and 25 and over students, was conducted to explore the final grade statistics of these different age groups. The under 25 students had a mean final grade of 2.14 (SD 1.52) and the 25 and over students had a mean final grade of 2.68 (SD 1.51). A t test was used to test the effects of age on the course grade means between the two groups, revealing a statistically significant difference between the groups, $t(347)$ = 3.29, p < .05, d = .36. The 25 and over students exhibited higher final course grade means.

Two hundred sixty-three students (76%) placed into remedial courses upon entering college. Thirty-four placed into all three remedial areas (reading, mathematics, and English), 78 placed into 2 areas, and 151 placed into 1 area. Further review of students in remedial courses versus students in non-remedial courses was conducted to explore the final grade statistics of these different course groups. The remedial course students had a mean final grade of 2.13 (SD 1.56) and the non-remedial students had a mean final grade of 2.15 (SD 1.40). A t test was used to test the effects of the nature of the course on the course grade means between the two groups, revealing no statistically significant difference between the groups, $t(347) = .09$, $p > .05$, $d = .01$.

Additional review of descriptive statistics revealed that 247 students were females (71.8%) and 98 were males (28.2%). Cumulative credits of completers entering the term of the sample ranged from 0 to 171 with a mean of 31.4 credit hours (SD = 34.09). The number of credit hours attempted during the term ranged from 3 to 19 with a mean of 9.8 credit hours scheduled (SD = 3.29). The GPAs of the students at the beginning of the term ranged from .00 to 4.0 with a mean of 2.41 (SD = 1.48). Sixty-six students (19% of the sample) had a .00 GPA. This large number is likely due to the entry level nature of the courses selected and so would include many first time in college students. One hundred sixty-two students had previously earned credits in online courses at the College ranging from 3 to 67 previous online credits with a mean of 14.4 credits (SD = 11.14). However, online credits from other institutions are not identifiable on incoming student transcripts. Thus, students taking online courses at other institutions and transferring these courses into the College would not be identified in this statistic. As a result, the number here likely underreports the actual online experience of some students. One

hundred thirty students had some history of receiving a withdrawal grade with a range of 1 to 23 courses withdrawn and a mean of 1.04 courses (SD = 2.17). This variable is of interest as it may be indicative of student persistence. However, students who withdrew from the courses used for the present study were removed from the correlation and regression analysis because the reason for withdrawal from these courses could not be determined and could be construed as a confounding variable. See Table 12 for detailed descriptive statistics.

Table 12

Demographic and Educational Background Statistics for Participants

	N	Minimum	Maximum	Mean	SD
Age	347	17.00	56.00	28.00	8.67
Cumulative Credits	347	0.00	170.65	31.4	34.09
Credits Scheduled	347	3.00	19.00	9.8	3.29
Grade Point Average	347	0.00	4.00	2.41	1.48
Previous Online Credits Earned	162	3.00	67.00	6.73	11.15
Withdrawn Courses	130	1.00	23.00	1.04	2.17

Results Regarding Research Question 1

Research question 1 concerned the relationship of student demographic and educational background factors (i.e., age, gender, academic placement, educational level, enrollment status, GPA, withdrawal history, and previous online course experience) to success in online courses. Data were analyzed using Pearson correlation and multiple regression. Final course grades were used as the dependent variable defining success in

online courses. Instructors assigned final grades of A, B, C, D, I, F, and FN (Failure for non-attendance). For analysis purposes, final course grades were coded: A = 4; B = 3; C = 2; D = 1; F, FN, and I = 0). Students who withdrew from the initiative courses were removed from the correlation and multiple regression analysis. Although a grade of W (withdrawal) is not a successful grade, the multitude of reasons for withdrawal could provide confounding factors for analyzing success characteristics.

Correlation

Pearson correlations are analyzed to provide findings regarding the relationships that exist between any two variables (Huck, 2008). Correlations were reported as statistically significant if at the 0.05 level or higher (2-tailed). The use of statistical significance tests (SST) as one reported measure is consistent with current accepted practice in the field of social science research. However, as Daniel (1998) stated, a report of statistical significance is not necessarily a report or interpretation of importance or of a noteworthy result. Although the term statistical significance is used in these findings, they should not be interpreted as presenting "significant differences or significant correlations" (p. 24). Daniel provided for further clarification, "An SST is simply a comparison of the value for a particular test statistic based on results of a given analysis with the values that are 'typical' for a given test statistic" (p. 24).

Analysis found that there was a statistically significant correlation between the dependent variable and independent variables age (r(346) = .195, p = .000), placement in mathematics remediation (r(346) = -.106, p = .049), placement in English remediation (r(346) = -.170, p = .001), and GPA (r(346)= .657, p = .000) as reported in Table 13. Note

that the correlations between placement in mathematics and English remediation and the

dependent variable were small negative correlations.

Table 13

Demographic and Educational Background Variables' Correlation to Final Grade

	r	*p*
Age	.195**	.000
Gender	-.063	.242
Placement in reading remediation	.004	.938
Placement in mathematics remediation	-.106*	.049
Placement in English remediation	-.170**	.001
Cumulative Credit Hours	.022	.682
Term Credit Hours	-.031	.565
Grade Point Average	.657**	.000
Previous Online Credits	.001	.981
Withdrawn Courses	.021	.690

Note. * p < .05, two-tailed. **p < .01, two-tailed.

Multicollinearity among demographic and educational history variables is low as

indicated in Table 14. The strongest correlations present were among placements in the

various different remedial subjects, and among cumulative credit hours and online course

experience or withdrawn courses. These correlations were still only between .31 and .45.

The tolerance and variance inflation factor (VIF) values displayed in Table 15 did not

meet the common cutoff thresholds of <.10 for tolerance value and VIF value of >10

(Hair et al., 2010); hence, evidence of collinearity was not found.

Table 14

Demographic and Educational History Correlation Coefficients (N=347)

		1	2	3	4	5	6	7	8	9	10
1	Age	1.000									
2	Gender	.037	1.000								
3	Placement in reading remediation	-.077	-.096	1.000							
4	Placement in mathematics remediation	.142	-.102	.318	1.000						
5	Placement in English remediation	-.027	.011	.451	.337	1.000					
6	Cumulative Credit Hours	.172	.107	.143	.169	.059	1.000				
7	Term Credit Hours	-.101	.034	.020	.088	-.054	-.136	1.000			
8	Grade Point Average	.139	-.044	-.197	-.121	-.263	.065	.031	1.000		
9	Previous Online Credits	.173	-.056	.039	.076	.003	.379	-.003	.118	1.000	
10	Withdrawn Course	-.022	.234	.097	-.186	.004	.395	-.018	.088	-.003	1.000

In summary, statistically significant correlations were found between the variables

age, placement in remedial mathematics and English, and GPA (Table 13) and

multicollinearity among all demographic and educational history variables was low

(Table 14).

Regression

Two standard multiple regression analyses were performed. This analysis method was selected as appropriate to provide further explanation of the relationship between the predictor and dependent variable. Huck (2008) stated that

Regression focuses on the variable(s) that exist on one or the other *ends* of the link. Depending on which "end" is focused upon, regression will be trying to accomplish one or the other of two goals. These two goals involve prediction on the one hand and explanation on the other. (p. 556)

The analysis conducted in the present study was for both purposes as the primary interest in the present study was in comparing the independent variables to determine the extent to which they help the regression analysis achieve its purpose or contribute to predictions and explanations (Huck, 2008). Analysis was performed using SPSS REGRESSION. All variables were entered into the regression simultaneously.

The first analysis was between the dependent variable (final course grade) and all 10 demographic and educational background independent variables: age, gender, academic placement areas (3 subject areas), enrollment status (credits attempted during term), educational level (cumulative credits), cumulative GPA, withdrawal history, and previous online course experience. The first regression analysis yielded a statistically significant prediction of the final course grade, $F(10, 336) = 30.27$, $p < 001$. R^2 for the model was .47, and adjusted R^2 was .46. Together, these 10 variables explained 47% (46% adjusted) of the variance in final course grade. Table 15 displays the unstandardized regression coefficients (B), standardized regression or beta coefficients (β), observed t value, significance level (p), and collinearity statistics for each variable.

Beta coefficients are provided for exploratory analysis purposes (Huck, 2008). Review of the beta coefficients indicate that GPA is the most important variable relative to its weight in predicting the final course grade. Both age and placement in remedial reading weighted more moderately.

Table 15

Regression Analysis Results for 10 Demographic and Educational Background Variables

Predictor Variables	B	β	t	p	Tolerance	VIF
Age	.023	.128	3.051	.002*	.896	1.116
Gender	-.094	-.028	-.683	.495	.958	1.044
Placement in remedial reading	.609	.157	3.652	.000*	.847	1.181
Placement in remedial mathematics	-.188	-.057	-1.336	.182	.875	1.143
Placement in remedial English	-.130	-.038	-.872	.384	.810	1.235
Cumulative Credit Hours	.000	-.007	-.126	.899	.469	2.132
Term Credit Hours	-.020	-.042	-1.037	.300	.955	1.047
Grade Point Average	.683	.659	15.663	.000*	.885	1.130
Previous Online Credits	-.008	-.058	-1.230	.220	.696	1.437
Withdrawn Courses	.004	.006	.122	.903	.653	1.532

Note. *$p < .01$, two-tailed.

Structure coefficients in multiple regression indicate the correlation between a predictor variable and a composite derived by weighting and aggregating the criterion variables and so provides valuable information regarding the relationships of observed variables to the composite (Thompson & Borrello, 1985). Nathans, Oswald, and Nimons (2012) stated, "A structure coefficient in MR analyses is a useful measure of a variable's

direct effect, as it quantifies the magnitude of the bivariate relationship between each

independent variable and in isolation from other independent variable- correlations" (p.

6).

Inspection of the structure coefficients indicates that age, placement in remedial

mathematics, placement in remedial English, and GPA are moderately related to the

predicted final course grade (Table 16), with GPA clearly serving as the strongest

correlate.

Table 16

Ten Demographic and Educational Background Variable Structure Coefficients

Predictor Variables	Structure Coefficients
Age	.283*
Gender	-.091
Placement in remedial reading	.006
Placement in remedial mathematics	-.153*
Placement in remedial English	-.247*
Cumulative Credit Hours	.032
Term Credit Hours	-.045
Grade Point Average	.954*
Previous Online Credits	.002
Withdrawn Courses	.031

Note. * $p < .01$ level, two-tailed.

The second analysis was between only those variables exhibiting statistically

significant correlations with the final course grade (age, placement in mathematics

remediation, placement in English remediation, and GPA). This analysis was conducted

to examine possible appreciable differences in beta coefficients. The second regression

analysis revealed that the model displayed a statistically significant prediction of the final course grade, $F(4, 342) = 68.47$, $p = 000$. R^2 for the model was .45, and adjusted R^2 was .44. Together, these 4 variables explain 45% (44% adjusted) of the variance in final course grade. Table 17 displays the unstandardized regression coefficients (B), standardized regression or beta coefficients (β), observed t value, significance level (p), and effect size for the 4 variables. No appreciable differences in the statistical significance of the beta coefficients were found in the second regression analysis as compared to the first analysis. Review of the beta coefficients indicated that GPA is again the most important variable relative to its impact on final course grade.

Table 17

Regression Analysis Results for 4 Demographic and Educational Background Variables

Predictor Variables	B	β	t	p
Age	.020	.113	2.74	.006
Placement in remedial mathematics	-.154	-.046	-1.109	.268
Placement in remedial English	.034	.010	.235	.815
Grade Point Average	.662	.638	15.071	.000

Inspection of the structure coefficients suggests that age, placement in remedial mathematics, placement in remedial English, and GPA are strong indicators of the variable final course grade (Table 18).

Table 18

Four Demographic and Educational Background Variable Structure Coefficients

Predictor Variables	Structure Coefficients
Age	.292*
Placement in remedial mathematics	-.158*
Placement in remedial English	-.255*
Grade Point Average	.985*

Note. * p < .01 level, two-tailed.

Both regression models indicated that 44 – 47% of the variance in final course grade could be explained by some combination of the variables included as demographic and educational history variables for the current study. Although this is not a high percentage and indicates only a moderate degree of predictability, the structure coefficients also indicated a statistically significant relationship between 4 of the variables (age, placement in mathematics and English remediation, and GPA) and the final course grade.

Results Regarding Research Question 2

Research question 2 concerns the relationship between learning readiness factors of personal attributes, learning style, life factors, technical competency, reading rate, and success in online courses. Data were analyzed using Pearson correlation and multiple regression. Data for scales achieving low reliability coefficients (reading, personal attributes, and technical competency) were initially included for correlation and regression analysis. However, due to the low reliability results, their contribution to the

prediction model may be suspect. For this reason, further analysis after removal of these scales is also provided.

Correlation

There was a statistically significant correlation between the independent variables personal attributes (r (346) = .157, p = .003), reading (r (346) = -.181, p = .001), technical knowledge (r (346) = -.118, p = .028), technical competence (r (346)= .158, p = .003), and life factors (r (346)= .183, p = .001) and the dependent variable final grade in course (Table 19).

Table 19

SmarterMeasure Scale Correlation to Final Grade

	r	p
Learning Styles	-.029	.587
Personal Attributes	.157**	.003
Reading Rate	.181**	.001
Technical Knowledge	.118*	.028
Technical Competency	.158**	.003
Life Factors	.183**	.001

Note. * p < .05, two-tailed. **p < .01, two-tailed.

Multicollinearity among SmarterMeasure variables is low as indicated in Table 20. The tolerance and variance inflation factor (VIF) values displayed in Table 21 are well below the common cutoff thresholds of <.10 for tolerance value and VIF value of >10 (Hair et al., 2010).

Table 20

SmarterMeasure Correlation Coefficients (N=347)

		1	2	3	4	5	6
1	Learning Styles	1.000					
2	Personal Attributes	.343	1.000				
3	Reading	.115	.188	1.000			
4	Technical Knowledge	.340	.218	.318	1.000		
5	Technical Competency	.053	.146	.451	.337	1.000	
6	Life Factors	.202	.463	.143	.169	.059	1.000

Regression

Two standard multiple regression analyses were performed. The first was between the dependent variable (final course grade) and all six SmarterMeasure independent variables (learning styles, personal attributes, reading, technical knowledge, technical competence, and life factors). In the second analysis, only the independent variables technical knowledge and life factors were included. During the item analysis of reliability coefficients reported earlier, only learning styles, technical knowledge and life factors exhibited acceptable internal consistency. In the correlation analysis, the learning styles variable exhibited a very low correlation with final grade. For these reasons, the independent variables learning styles, reading, personal attributes, and technical competency were removed from the second analysis.

The first regression analysis yielded statistically significant prediction of final course grade, $F(6, 340) = 5.007$, $p = 000$. R^2 for the model was .081, and adjusted R^2 was

.065. Although statistical significance was found, together, these variables explain only a small percentage of the variance (8% and 6% adjusted) in final course grade. Table 21 displays the unstandardized regression coefficients (B), standardized regression coefficients (β), observed *t* value, significance level (*p*), and collinearity statistics for all 6 variables. Only moderate importance is indicated by the beta coefficients for learning styles, reading and life factors. Again, the low reliability coefficients found in item analysis for reading, personal attributes, and technical competency are problematic and so may call into question the accuracy of the predictability of these scales.

Table 21

Regression Analysis Results for 6 SmarterMeasure Scales

Predictor Variables	B	β	*t*	*p*	Tolerance	VIF
Learning Styles	-.014	-.123	-2.140	.033	.800	1.250
Personal Attributes	.018	.093	1.501	.134	.705	1.418
Reading	.009	.106	1.778	.076	.754	1.326
Technical Knowledge	.008	.058	.964	.336	.753	1.328
Technical Competence	.012	.076	1.255	.210	.746	1.341
Life Factors	.022	.136	2.305	.022	.776	1.288

Inspection of the structure coefficients suggests that personal attributes, reading, technical knowledge, technical competence, and life factors were correlated to a reasonable degree with the predicted values of the dependent variable (Table 22). Again, the low reliability coefficients found in item analysis for reading, personal attributes, and

technical competency are problematic and so may call into question the accuracy of the predictability of these scales.

Table 22

Six SmarterMeasure Scale Structure Coefficients

Predictor Variables	Structure Coefficients
Learning Styles	-.103
Personal Attributes	.550*
Reading	.637*
Technical Knowledge	.414*
Technical Competence	.554*
Life Factors	.643*

Note. * p < .01 level, two-tailed.

The second regression analysis was conducted to examine possible appreciable differences in beta coefficients. This regression analysis indicated statistically significant prediction of final course grade, $F(2, 344) = 7.427$, $p = 001$ using only the technical knowledge and life factors variables. R^2 for the model was .041, and adjusted R^2 was .036. Again, although statistical significance was found, together, these variables explain only a small percentage of the variance (4% and 3% adjusted) in final course grade. Table 23 displays the unstandardized regression coefficients (B), standardized regression coefficients (β), observed *t* value, and significance level (*p*) for each variable in this analysis. No appreciable differences in the statistical significance of the beta coefficients were found in the second regression analysis as compared to the first analysis. Beta

coefficients indicate a moderate and equal importance among these two predictor

variables.

Table 23

Regression Analysis Results for 2 SmarterMeasure Scales

Predictor Variables	B	β	*t*	*p*
Technical Knowledge	.013	.090	1.672	.095
Life Factors	.027	.168	3.139	.002

Inspection of the structure coefficients suggests that technical knowledge and life

factors are both correlated adequately with the predicted dependent variable scores (Table

24).

Table 24

Two SmarterMeasure Subscale Structure Coefficients

Predictor Variables	Structure Coefficients
Technical Knowledge	.580*
Life Factors	.901*

Note. * p < .01 level, two-tailed.

In the two regression analyses conducted to address this research question, the

variance explained in the model for the SmarterMeasure variables was a very small 4 –

8%. However, the structure coefficients for 5 of 6 of the variables indicate a meaningful

relationship exists between the predicted dependent variable scores and the five

predictors: personal attributes, reading, technical knowledge, technical competency, and

life factors.

Summary of Chapter

The purpose of this study was to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online courses as defined by final course grades. Chapter 4 presented the analysis of the item reliability estimates for scores on the SmarterMeasure readiness assessment for the study's sample. The findings of this analysis indicate a problematic reliability level for 3 of the 6 scales of the readiness assessment. Also presented were student demographic, educational background, and readiness indicator variables in relationship to the final grade obtained for online courses attended during one term of enrollment. Findings of this analysis indicate that several of the independent predictor variables were appreciably related to the final grade received in the course.

Chapter 5 presents a discussion of the findings and limitations of this study, the practical implications of those findings, their potential applications to practice in student support services, and suggests recommendations for future research.

CHAPTER 5

SUMMARY, DISCUSSION, AND CONCLUSIONS

As stated earlier, the rise in online education offerings is an enormous benefit to students otherwise denied access to higher education due to lack of proximity to institutions or inability to attend classes during traditional hours due to work or family obligations. In providing these offerings, colleges and universities must ensure that this student population is provided with the needed student support services.

Identifying the characteristics of the population of students participating in online learning is important to all members of the educational community supporting students for success in the online environment. Educators need increased knowledge of the individual student factors impacting success in online courses and programs. Identification of the demographic, cognitive, metacognitive, and behavioral characteristics required and possessed by students are the initial analyses necessary to identify the appropriate student support systems needed to assist students in the online learning environment. When these factors are identified, a model of support is required that will provide services to ensure students' initial and continued success.

Communication structures, orientation, academic support services, student services, technical support services, sound andragogical course development, and faculty development and responsiveness are a few of the institutional best practices that can

result from a clearer, more comprehensive understanding of online student success characteristics, skills, and needs.

The purpose of this study was to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online courses as defined by final course grades. This study focused on the following research questions.

1. What is the relationship of student demographic and educational background factors such as age, gender, academic placement, educational level, enrollment status, grade point average, withdrawal history, and previous online course experience to success in online courses?

2. What is the relationship of learning readiness factors of personal attributes, learning style, life factors, technical competency, technical knowledge, and reading rate to success in online courses?

Summary of the Study

The study analyzed data regarding students at a state college enrolled in online courses during a single term. Archival data from the readiness assessment SmarterMeasure (previously named READI) Learning Readiness Indicator results as well as demographic, educational background, and end of course grades data from available student records were collected for students registered in 16 selected course sections. The SmarterMeasure Learning Readiness Indicator is a web-based, 122-item assessment intended to measure a learner's readiness for success in an online learning environment. The scales measured in the instrument are personal attributes (previously named

individual attributes), learning styles, life factors, technical competency, reading rate, and typing skills (SmarterMeasure, 2013a).

The statistical techniques of correlation and multiple regression analysis were applied to analyze the relationship between the dependent variable of student success and independent variables of student characteristics and readiness and to determine the predictive nature of the independent variables. Correlation and multiple regression analysis was used to explain and predict (Huck, 2008) why some students are more or less likely to succeed in online courses, thereby offering educators valuable information for offering support services and interventions to learners.

Findings

This study found that there was a statistically significant correlation between the independent variables age (r (346) = .195, p = .000), placement in remedial mathematics (r (346) = -.106, p = .049), placement in remedial English (r (346) = -.170, p = .001), and GPA (r (346)= .657, p = .000) and the dependent variable final grade in course. There was also a statistically significant correlation found between the independent variables personal attributes (r (346) = .157, p = .003), reading (r (346) = -.181, p = .001), technical knowledge (r (346) = -.118, p = .028), technical competence (r (346)= .158, p = .003), and life factors (r (346)= .183, p = .001) and the dependent variable final course grade.

Regression analysis of the 10 demographic and educational background variables indicated a statistically significant result, $F(10, 336) = 30.27$, p = 000. R^2 for the model was .47, and adjusted R^2 was .46. Inspection of the structure coefficients suggests that age, mathematics placement, English placement, and GPA were related appreciably to the predicted dependent variable values.

Regression analysis of the 6 SmarterMeasure variables also yielded a statistically significantly prediction of grade, $F(6, 340) = 5.007$, $p = 000$. R^2 for the model was .081, and adjusted R^2 was .065. Inspection of the structure coefficients suggests that personal attributes, reading, technical knowledge, technical competence, and life factors are appreciably related to the predicted dependent variable scores.

Delimitations and Limitations

This study was delimited in several areas. Only one state college was studied. Eighteen sections of nine online courses were selected for the initiative utilizing the SmarterMeasure Learning Readiness Indicator during a single academic term. The courses selected were all deemed entry-level remedial or college credit courses. The variables gathered were from the limited data sources of those participants that completed the SmarterMeasure instrument during the initiative and remained enrolled in the courses. Data were collected at a single point in time. Also, five of the nine courses selected for the initiative were remedial level courses. Three remedial mathematics courses, one remedial English course, and one remedial reading course (two sections of each course) were included in the sample data.

A limitation of this study is the low levels of the internal consistency reliability estimate for the scores on scales of the SmarterMeasure readiness assessment instrument. Cronbach alphas for scores on the learning styles, technical knowledge, and life factors subscales were, respectively, .83, .79, and .75, indicating that these subscale scores had acceptable internal consistency. Cronbach alphas for scores on reading, personal attributes, and technical competency were, respectively, .55, .51, .38 indicating that scores on these scales did not have strong internal consistency.

Another limitation of the present study was the removal of all data from students who had withdrawn from the courses. This resulted in lost variance of part of the sample. The decision was made to remove these data because the reasons for student withdrawal are quite varied. Student withdrawal reasons might include fear of failing the course (poor performance), illness or injury, personal or family obligations, and work obligations to name a few. The reason regarding fear of failure would indicate that the student was performing poorly and so the data might have contributed to the overall relationship to success. However, in the present study I did not have access to student reasons for withdrawal and so all withdrawn student data were removed before analysis. And the result was that the present study did not include students who may have withdrawn because of low performance and so these were lost from the data set.

Another limitation of the study was in the coding of the dependent variable. The assigned grades for final course grades were A, B, C, D, F, FN and I. Three of the seven assigned grades were coded as a 0 for analysis purposes. The other four grades were assigned single digit codes of 4 through 1. When computing grades in courses, faculty use point structures and percentages for final grade assignment. This provides more variance within the construct of "grade" or success in the course. Using a definition of success of a letter grade re-coded as a single digit may have resulted in lost variance. Identifying success in the present study as the dependent variable of final course grade is a limited outcome measure of learning. Student success is also defined by specific learning outcomes and persistence.

A final limitation of the present study was the narrow review of the course characteristic variable. The present study did not include access to the courses in the

learning management system. Although a review of course syllabi was conducted, a more detailed review of course design and participant interaction within online courses would have provide a wider base of knowledge to analyze this important component's possible impact on student success and final grades.

Discussion of Findings

The findings of this study provide many areas for discussion and consideration. This discussion will be structured around the readiness assessment instrument data reliability findings and the findings for each of the research questions.

Discussion Relative to Assessment Data Reliability Findings

Although the stated lower limit of reliability for most social science research is a Cronbach alpha of .70, there is precedent for accepting lower levels of reliability based on the circumstances of the measurement and the study goals. Pedhazur and Schmelkin (1991) stated that various authors have provided different guidelines and instances when lower reliability may be tolerated. One circumstance that Pedhazur and Schmelkin described is that in early stages of research, lower reliability coefficients are tolerable. The present study could be considered early stage research into the factors contributing to success in online courses at the state college level. Also, as indicated by Pedhazur and Schmelkin, accepted reliability levels vary considerably in research literature even by the same researcher from one study to another. Specifically, the authors stated "it is for the user to determine what amount of error he or she is willing to tolerate, given the specific circumstances of the study" (Pedhazur & Schmelkin, 1991, p. 110). Henson (2001) reported the same conclusions regarding accepted reliability levels. The instrument used for the present study was selected by the college for the initiative as it was one of a very

few instruments available that proposed to measure the constructs of interest that had also published reliability estimates. The published estimates were provided in Chapter 3 (Table 4). For the purposes of this study and the interpretation of the study findings, I was willing to tolerate the lower reliability estimates obtained for the variables reading and personal attributes, however, acknowledging the attenuation of correlations from this acceptance.

Discussion Relative to Research Question 1 Findings

The findings of this study with regard to research question 1 indicate that the age, academic placement, and GPA of students taking online courses may have a statistically significant relationship to their final grade and so success in their courses. These findings regarding demographic and educational background variables suggest that a more mature, non-traditional student who has a higher GPA and did not place into remedial mathematics or English may have a stronger opportunity for success in the online environment.

Age. It is interesting to find that the age of students was related to course success with increased age indicating greater success. The mean age of the study sample of 28 years old is very close to the median age of college credit students at the college of 27 years old. A student's age could be a factor in success for many reasons. Older students taking college classes could be returning to school after spending time in the workforce or due to family obligations that prevented continuing formal learning and pursuing educational goals. The reasons for delaying continued education may be factors in whether students had gained increased academic ability or potentially forgotten some of the academic knowledge attained in earlier learning environments. However, the finding

in this study that there is a relationship between a more mature student and success in the courses could indicate that the more mature student has learned behaviors and life lessons that benefited them in the educational environment.

Regardless of the reason behind the greater success for older students, this finding indicates that the reverse, or lower success rates for younger students, may be an area of concern for practitioners. Younger students may then need greater support and access to support services than their older peers. Reaching out to this population early in their transition from high school to college may provide an opportunity for increasing the success rates for these younger students. Discussion of recommendations for orientation, first-year experience, and mentoring services is offered later in the chapter.

Grade Point Average. The finding regarding student GPA is the most significant finding of the present study. Almost all of the explained variance of the demographic and educational history variables is explained with GPA. The other variables of age and remedial placement have smaller contributions. This conclusion is an expected and reasonable outcome as indicated in the literature (Bell, 2007). Students who have already exhibited success are more likely to have displayed the behaviors and gained the skills that lead to academic success. Students who had a strong GPA prior to taking the initiative courses included in the present study presumably already had an academic history of success. The findings indicate that they continued with this trend. The community and state college system, however, has little or no option for limiting access to the institution because of low prior GPA. The expectation of maintaining standards of academic progress can often result in establishing acceptable GPAs (often 2.0) for continuing course enrollment. This is one of the few ways that GPAs are

monitored and so can become gatekeepers to continued enrollment. However, entry or admission into the state or community college system is open to any high school graduate.

The finding regarding GPA, although not surprising, could lead to ideas for future practice. Students identified as successful, through GPA or other success measures, provide a resource for the colleges to draw on as student leaders to provide support to other students in the institution.

Academic Placement into Remediation. The academic placement findings show the same trend as the GPA finding in the reverse. Students who had placed into remedial mathematics or English courses tended to have less successful results in their final grades. A limitation of the data that may have had an impact on this finding is that five of the nine courses selected for the initiative were remedial level courses. Students in three remedial mathematics courses, one remedial English course, and one remedial reading course (two sections of each course) were included in the sample data. Students that are placed in remedial courses in college have either struggled with the academic subjects of basic mathematics, reading, or English or have performed poorly on academic assessments for other reasons such as having been out of school for a period of time. Taking these remedial courses or other college level courses in the online environment would be an added challenge for success.

The findings relative to research question 1 identify that older, more mature students who come to college academically ready are likely to be more successful in the online learning environment.

Discussion Relative to Research Question 2 Findings

The findings regarding research question 2 indicated that scores for students on the SmarterMeasure scales of personal attributes, reading, technical knowledge and competency, and life factors also may have a relationship to their final grade in their online course. Although the predictive relationships were not strong, the findings regarding the SmarterMeasure variables suggest that students who are better equipped and prepared in the readiness factors assessed may have a slightly higher grades as well. The low reliability levels of the instrument may have had an impact on the predictive relationships or correlations in the present study. However, although the item reliability results of the assessment for this sample were low, the constructs represented by the readiness assessment scales of self-regulating skills, self-efficacy, and personality factors are often deemed as important for success in college and in the online environment (Artino 2008, 2009; Conley, 2008). The findings of the present study appear to moderately support this assertion. Students scoring higher on the readiness assessment areas indicated received higher grades in their courses. And although, generally speaking, in the social sciences an explained variance below 10% is considered trivial, the trend of the data indicated that several of the variables show a relationship among the synthetic correlation variables provided in the structure coefficient results in Table 16. The findings indicate that these variables are not strong predictors of or do not have a causal relationship to final course grade; however, a relationship does exist in general.

As the readiness construct is well correlated to the dependent variable, the identification and awareness of each student's readiness for learning in general, and learning in an online environment in specific, appears to be somewhat beneficial. Also,

students who are more aware of the importance and impact of the factors that are involved in being successful in college may have a better chance of ensuring that these factors are incorporated into their daily lives and study routines. This may offer opportunities for intervention rather than relying on the findings alone to predict the outcomes. This is a potential area for future research that is discussed later in the chapter.

Life Factors. The subscales included in the life factors scale include availability of time and place to study; one's reason for continuing education; support resources from family, friends and employers; and perception of academic skills. The life factors variable indicated a moderately strong correlation (.643) in the structure coefficient findings. Early identification of strengths and weaknesses could allow opportunities to make needed adjustments and plans for improvement of these important variables.

Personal Attributes. The subscales included in the personal attributes scale include procrastination, time management, persistence, willingness to ask for help, academic attributes, and locus of control. The personal attributes variable also indicated a moderately strong correlation (.550) in the structure coefficient findings. As discussed previously, these attributes have been studied extensively and have been found to be important factors in student satisfaction and achievement (Artino, 2007, 2008, 2009; Artino & Stephens, 2009; Hsu & Shiue, 2005; Hu & Gramling, 2009; Tsai, 2009). This is another area that the simple identification and awareness of strengths and weaknesses afford students opportunities for growth and practitioners an opportunity to provide supportive development resources and services.

Reading. The findings regarding the reading variable in the readiness assessment instrument are in contrast to the placement in reading remediation finding in research

question 1. In this variable a statistically significant correlation between reading scores on the assessment and final grade was found, however, in the analysis results in the first question a correlation to placement in remediation was not found. The difference in these results could be explained by the difference in the definitions of the variables. In the readiness assessment, reading is directly measured in terms of on-screen reading recall. This is a direct measure of the participant's ability to read and comprehend on-screen material in an online learning environment. The reading variable indicated a moderately strong correlation (.637) in the structure coefficient findings. Students sometimes spend a great deal of time reading on-screen material in the online learning environment. As more online courses are attempting to move away from print texts to offering online or digital course materials, this skill will continue to be critical to success in the online classroom.

Technical Skills. The findings regarding technical skills are similar to the other readiness variables. There appears to be a slight relationship between technical skills and final course grades. However slight this relationship, offering students resources for increasing their knowledge of and competency in utilization of the technology included in the online learning environment is another area for potential supportive intervention.

Conclusions and Recommendations

As far as the stated purpose of this study, to determine the relationship between identified student characteristics, readiness factors and measures of success, I believe that some valuable information has been discovered. However, I cannot say that the findings were particularly helpful or impactful in and of themselves. If the purpose of the study was to find a panacea or prescription that could be fit to all or most online students to

support or increase success, then I would have to say that that goal was not reached.

However, the findings provide an opportunity to re-frame the idea of support services for

distance learning students. The findings of this study indicate that there is a large

variance in the sample of students with regard to their demographic, educational history,

and readiness characteristics. While it is potentially in the best interest of the institution

to identify service opportunities that can be provided easily to large student bodies, the

reality is that student services personnel need to view student populations as unique

individuals in need of a variety of many different service offerings. For this purpose, a

model of defined, concierge-type services provided in an online and virtual environment

is an option that must be explored. This concierge-type service model could provide those

services needed by individual students utilizing technology that would identify needs and

interests based on student behaviors in the online classroom and student portal.

Recommendations for Practice

The demographic, educational history, and readiness skills identified for success

by the present study and others may be helpful to practitioners involved in providing

student and academic services to students in an online environment. Although this study

focused on students that were taught in fully online courses, providing online services to

students in face-to-face and blended or hybrid courses is also an important endeavor.

Many students that may be able to come to campus for face-to-face classes take

advantage of night and weekend course offerings due to other work and family

obligations that prevent them from attending during the day. Many student support

services are not open for students attending night and weekend classes. For this reason,

the extension of online support services to all students at the institution is also a worthy undertaking.

As first discussed in Chapter 2, for higher education institutions that provide greater access through open enrollment policies and online options, it is imperative to provide the communication and development systems to support students who are new to the college and the online learning environment. As indicated by the findings in this study, these students are not all traditional entering freshmen just graduating from high school. Many are entering or returning adults. Providing communication structures, orientation, student support services, academic support services, technical support services, sound andragogical course development, and faculty development are the practices that must be considered and implemented to provide a strong student-centered online learning environment to support student achievement (Kuh, 2007a; McCracken, 2004, 2008).

Communication. Development and integration of virtual social networks into the culture, community, and collegiate life of an institution provides for a much more vibrant, accessible, and welcoming opportunity for a wider audience of student populations. While the more traditional students today, having grown up using these social networking tools, could benefit from this environment, those students that are at a distance or have work and family commitments that prevent engagement in on-campus activities may gain even greater benefit from such an environment.

The ideal communications system or portal would integrate the institution's business system, student support, academic support, learning environment, and collegiate life or engagement opportunities (McCracken, 2004, 2008). Many institutions have

student portals that are built to enable students to register, conduct business, and view academic records. However, few of these portals offer the opportunities for engagement in collegiate life, student activities, and service learning options (McCracken, 2004).

Readiness Assessment. Readiness assessment can take many forms. Some assessments are short, 10 question, self-assessment measures providing a minimal awareness to potential students of the basic skills required for success. These tend to ask students to report on their technology skills, self-motivation, and time-management skills. Other assessments delve more deeply and thoroughly into self-regulatory skills, learning styles, personality, and work or family commitments. Although the correlation to and predictability of success these instruments provide may be minimal, the awareness gained by students is valuable information. The assessment itself is a form of communication of expectations or skills needed for success. This awareness, used in conjunction with an orientation or other learning opportunity, can provide students with information on how to prepare for the more rigorous classroom learning environments they are entering in higher education.

Faculty in the online classroom can also use the assessment results to provide a variety of learning options to meet different students' learning styles and personality attributes. In the field of instructional design, the student profile is an important informational source for development of appropriate learning activities and assessment options. Faculty members that understand their students' readiness characteristics are also better prepared and able to offer support and interventions to students in need of additional help or support.

The results of the assessments can also be used to guide students to appropriate individual support options such as advising, counseling, and tutoring. The report received by students completing the assessment in this study provided links to useful information and resources found online through a variety of providers. More relevant and targeted support options can be provided that steer students to resources offered by specific institutions.

Orientation. Although the present study's results indicate that more mature students are somewhat better prepared and may be more successful in entry level online courses, all student entering the online environment for the first time can experience apprehension and insecurity regarding expectations, skill needed to be successful, time commitment needed, communication methods with peers and faculty, and many other factors involved in a technology-rich environment.

As previously stated, the range of orientation or first-year experience options that institutions provide is wide. Some options are shorter offerings that include a short introduction to the online services and resources offered, a preview of the online course environment and video tutorials of course navigation, and virtual access to advisors and tutors. Other options include first-year experience programs that offer this same early information, but then carry forward the experience into courses offered during the first year such as student life courses and workshops to help students engage with others and the institution. Whichever option is offered, orientation or first-year experience, the curriculum should be developed by instructional design professionals to meet a specific set of student learning outcomes identified by individuals from both the student services and academic areas.

Monitoring and Mentoring. Monitoring student performance and success is also a critical service necessary for online success (Kuh, 2007b) that is difficult to provide and often not well executed in institutions. Distance learning students have the additional disadvantage of being out of sight and, so, out of mind. For many, the faculty and classmates in their online courses are the only touch-point for engagement with the institution. Some of the course management systems provide course level statistics and early alert systems that facilitate faculty awareness of student engagement through logon, posting, and grade statistics. However, faculty awareness of and use of these systems may be limited. Providing additional systems and training for faculty in this area could be beneficial. Utilization of automated notifications and alerts can assist faculty in identifying students in need or at risk. Then the faculty member can reach out and offer needed assistance or referral to appropriate supportive resources.

Academic Support Services. Students placing into remediation need to have ready access to academic support services that may be difficult to access from a distance. The issue regarding academic readiness and remedial education at the college level is a national concern. Remedial education in higher education institutions presents an enormous challenge. Many different models of academic support for under prepared students are offered throughout the world. Success rates for these programs vary. However, few appear to offer a replicable model for use by others. At a minimum, providing diagnostic assessment, remediation, and supportive academic tutoring and/or coursework is an imperative.

These recommendations for practice provide a model or framework for educational leaders to support students in academic and student services critical to success and retention in the online learning environment.

Recommendations for Future Research

The focus of this study was on individual student characteristics as defined by either a readiness assessment or existing demographics and education history factors. Several recommendations for future research are provided based on the findings of the present study.

Student Behaviors. The first recommendation for future research is regarding the student behavior that leads to educational success. Future research focusing on the exhibited or observable student behaviors in the online classroom that are potentially linked to online success could provide valuable insight. This research might be appropriate for qualitative study to explore what observable or reportable student behaviors are exhibited in the online learning environment. Observed or tracked behaviors could include in-class study and self-regulatory behaviors and out-of-class help-seeking behaviors. Help-seeking behaviors include meeting with advisors, tutoring sessions, and engagement in student life activities such as student government and clubs. Although the literature indicates that engagement is an important success component in higher education, specific research on behaviors would be worthwhile.

SmarterMeasure Readiness Indicator. A second recommendation for future research is regarding the use of the SmarterMeasure Readiness Indicator and other assessment instruments for measuring readiness of students for online learning. There were several factors regarding the use of the SmarterMeasure readiness assessment that

are identified in the findings. Although the reliability of scores for some of the assessment scales may have been problematic in this study, further research on the reliability of the scales with other sample groups and different populations would be helpful for potential users of this instrument. It may also be useful to experiment with adding items to the scales in an effort to increase score reliability. Also additional research on the impact of the student characteristics measured by the instrument on student success and retention would provide valuable information. Although the predictive value of readiness assessments may be questionable, the value for student knowledge and potential impact on self-efficacy and self-regulation is a noteworthy area for future research.

Self-report Assessments. A third recommendation for future research is regarding the use of self-report assessments in general. Future research on the effectiveness and accuracy of self-report mechanisms for assessment of readiness or personal attributes would be valuable. The connections between self-report, self-awareness, and self-reflection are worth further exploration. The accuracy of self-report to the actual student behavior or performance may be difficult to ascertain. However, methods that test these conditions would be beneficial.

Student Supportive and Intervention Programs and Services. A fourth recommendation for future research is regarding the impact of providing student supportive and intervention programs and services. As most of the recommendations for practice presented in this chapter are focused on providing student and academic services and interventions, further research on the impact of these services and interventions is needed. Searches of the literature around the impact of these services on student success

and retention yielded few resources for review. The impact of student awareness of readiness and the provision of interventions when readiness is lacking could be worthwhile future research.

Measures of Student Success and Learning. There are many different methods to measure student success through a variety of student learning outcomes that should be included in future research regarding online learning. Student learning and success measures include, but are not limited to, specific learning outcomes, course grades, GPA, satisfaction, and retention. Future research should include a variety of measures in the variables considered.

Instructional Design. A final recommendation for future research involves the field of instructional design and the impact design and instructional methodology have on student learning outcomes. Much knowledge can be gained by studying the relationships of course interaction, participation, and methods of delivery in the online classroom.

In summary, six recommendations for future research are provided. These recommendations are focused on the potential impact of various factors or services that may have influence on student success in the online learning environment.

Conclusion

The purpose of this study was to determine the relationship between identified student characteristics and readiness factors and measures of success in selected online courses as defined by final course grades. This retrospective, applied research study utilized deductive methods in a non-experimental research design to gather existing data, conduct quantitative analysis, provide findings, and offer recommendations regarding this analysis.

The literature review and the findings of the present study support the importance of the constructs measured by the readiness assessment used in the present study. Regardless of the predictive ability or value of this specific assessment instrument, the relationship of the constructs identified in the assessment to student success in the courses was quantifiable. The non-cognitive skills of time management, persistence, help seeking, and identification of support resources are important factors related to success and retention. The question regarding how these factors impact success and retention may be related to the students' increased self-knowledge, self-efficacy, or self-regulatory skills. Does a student's awareness of the need for these skills present an opportunity for intervention and learning to develop the skills? It could be construed that students who gain a more thorough knowledge and understanding of the skills and commitments required for success in learning in the online environment are better able to prepare for these requirements and responsibilities. Following this assertion, then, it is the responsibility of student services personnel at the higher education institution to assist the student in identification of the areas of strength and to provide supportive services for the areas in need of improvement.

The findings of this study regarding unique, identifiable student characteristics that impact success lead to another conclusion related to providing strong student support services. The study identified age, placement in remediation, and GPA as factors that had a relationship to success in online courses. The strongest relationship to and predictor of success was a student's GPA entering the course. However, the usefulness of this finding is difficult to determine in the state and community college environment. Unlike most universities, many state and community colleges have a mission and mandate of open

access and open enrollment. Rigorous or elevated admissions standards may not be an option for screening entering students. Without strict admissions standards, student support services must be available to supplement the academic offerings at the college level.

Some students will come to the college underprepared. The options for providing the support services needed for all students are many and varied. Current trends in national and state legislative policy and directives indicate a major shift in thinking regarding developmental or remedial education. What services students need and how these should be offered is a very current, important, and dynamic conversation that is taking place. Some of the options available or recommended include increased tutoring services (face-to-face and online), self-contained courses, self-paced instructional modules, laboratory-style offerings utilizing increased technology resources, and many more approaches.

Whether the support services offered are academic or student service related, one major conclusion of this study is that the services need to be as varied as the student population. There is no one service or offering that will fit the needs of all students attending the college. A model of concierge or cafeteria style service options may best fit the complex and variable needs of the state college student population. Service ideas in this model include personalized web sites, menus of student services for students to choose from, personal assistance and relationships with staff or peer mentors, and online student and technical support, to name a few.

As online learning continues to grow throughout the world, finding ways to identify and support student needs outside the classroom becomes more critical.

Educational leaders can identify direct returns on investment for providing these services through increased student satisfaction, retention, and success. The investment in early communications and systems of support will pay out with increased enrollment and graduation rates.

Appendix A

Institutional Review Board Waiver: University of North Florida

Email Text:

Champaigne, Kayla <k.champaigne@unf.edu>

Tue, Sep 25, 2012 at 11:47 AM

Project not Research Involving Human Subjects

Hi Ms. Clark,

I'm writing in regards to your request IRB inquiry as to whether your proposed project would constitute research involving human subjects. Because the data you are planning to analyze will not be recorded in such a manner that the identity of the subjects can be *readily* ascertained by you or associated with the information, this project has been declared not human subject research based on the federal definition of "research involving human subjects" as stated in the U.S. Department of Health and Human Services Code of Federal Regulations 45 Part 46 (46.102). Therefore, it is not necessary for this project to be reviewed and approved by the UNF IRB. Please keep a copy of this email which will serve as the waiver for your project. Thank you so much for being conscientious and taking the time to contact the UNF IRB with respect to your project. We appreciate that you understand the value of IRB review of projects that may involve human subject research. Please contact us should anything change about your project that might make it human subject research. Feel free to let us know if you have any questions or concerns. Have a great week and good luck with this project!

Sincerely,

Kayla Champaigne Research Integrity Coordinator Office of Research and Sponsored Programs
University of North Florida

Appendix B

Institutional Review Board Waiver: Florida State College at Jacksonville

Email Text:

RE: IRB Request for Waiver
Renninger , Phyllis A.

To: Clark, Melanie S.   Wednesday, October 03, 2012 8:44 AM

Melanie

I wanted to send an e-mail to confirm our conversation regarding your request IRB inquiry. The data you will be analyzing does not appear to fall under the heading of human subject research as defined in the U.S. Department of Health and Human Services Code of Federal Regulations 45 Part 46 (46.102).

For this reason, your project would fall under a "waiver" status and it will not be necessary for this project to be reviewed and approved by the FSCJ Institutional Review Board.

Please contact me if anything should change about your project over the course of developing your full dissertation or methodology. There is a "light at the end of the dissertation tunnel,' best of luck.

Dr. Phyl Renninger
FSCJ IRB Human Subject Administrator

Phyllis Renninger, Ph.D., GPC Director of Resource Development Florida State College at Jacksonville 501 W. State Street, Suite 203 Jacksonville, FL 32202 (904) 632-3327 Fax (904) 356-5681 Email prenning@fscj.edu
Member of the Council for Resource Development (CRD), President of the Florida Council for Resource Development (FCRD), and Journal editor for VICISSITUDE: A Refereed Journal for College Leaders sponsored by the National Association of Community and Technical College (NACTC)

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Professional Experience

Florida State College at Jacksonville, Jacksonville, FL

Associate Dean of Student Success	2010 - Present
Open Campus Enrollment Leader	2006 - 2010
Learner Support Center Manager	2002 - 2006
Instructional Program Coordinator/Interim Instructional Program Manager	1991 - 2002

City College of Chicago - Europe

Assistant Programs Coordinator	1986 - 1989

United States Army   1979 - 1985

Aviation Officer: Qualified as fixed and rotary wing pilot.

Educational Experience

University of North Florida, Jacksonville, FL
Doctor of Education in Educational Leadership, 2013
Master of Education in Counselor Education, 2000

University of Florida, Gainesville FL
Bachelor of Science in Special Education, 1979

Presentations

Clark, M. S. (2009). *Danger: Using stepwise variable entry may lead to misinterpretation of your regression result.* Paper presented at the Mid-South Educational Research Association Meeting, November 4 - 6, 2009, Baton Rouge, LA.

Clark, M. S., Crosby, L. & Hardy, K. (2007). *Lights, camera, action! Are you ready to star in the virtual transfer college fair.* Presented at the Florida Association of Community Colleges Student Development Commission Conference, May 16 - 8, 2007, St. Augustine, FL. and the National Academic Advising Association Conference, March 4 - 6, 2007, Tallahassee, FL.

Clark, M. S., Huntley, S., Kissinger, J. & Puzziferro, M. (2006). *Growing your online program: Recruiting, hiring, and mentoring virtual faculty.* Presented at the Instructional Technology Council e-Learning Conference, February 11 - 4, 2006, Savannah, GA.

Baker, J., Clark, M. S., Kissinger, J. & Puzziferro, M. (2005). *Span the silos for comprehensive distance education.* Presented at the Sloan-C International Conference, November 17 - 19, 2005, Orlando, FL.

Clark, M. S., Jowers, C., McGlone, V., Puzziferro, M., & White, L. (2005*). Effective online student support services.* A preconference workshop presented at the International Conference on College Teaching and Learning, March 29 - April 2, 2005, Jacksonville, FL.