AN ANALYSIS OF THE ToOLS ONLINE READINESS INSTRUMENT AS AN INDICATOR OF STUDENT SUCCESS IN ONLINE COURSES IN A COMMUNITY COLLEGE ENVIRONMENT

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Abstract: As online learning increases its presence in higher education, there is value in identifying instruments to accurately and reliably assess the readiness of students to succeed in this learning environment. One instrument used by numerous institutions is the *Test of Online Learning Success* (ToOLS). This study examined the psychometric properties of the ToOLS online readiness instrument and its efficacy as an indicator of success in online courses, with specific focus on the community college environment. The sample for the study comprised 157 students enrolled in online courses in a community college in a Mid-Western urban environment. Data was collected via online survey methodology and extraction from institutional sources. The study found that ToOLS had sound content validity based on comparison with the research literature, and good reliability, both internal and test/re-test. Analysis of its underlying factor structure was not possible due to sampling issues in the original validation study in the literature and sample size limitations in the present study However, despite its psychometric acceptability, ToOLS was not found to be a successful indicator of student grades in online courses. There was evidence that the failure of ToOLS in this capacity may stem from being outdated in identifying the factors that currently contribute to readiness for, and success in, online learning. It was recommended that ToOLS be used by community colleges to identify specific online readiness factors that may pose difficulties for individual students, but not as a general indicator or predictor of online learning success.

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CHAPTER I

INTRODUCTION

Over the years many different types of readiness in adults have been studied and researched. For example, researchers have explored organizational readiness (Lehman, Greener, & Simpson, 2002), technology readiness (Parasuraman, 2000), transformational readiness (Armenakis & Harris, 2002), motivational readiness (Marcus, Rakowski, & Rossi, 1992), change readiness (Miller & Tonigan, 1996), disaster readiness (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008), and school readiness (Duncan, Dowsett, Claessens, Magnuson, & Huston, 2007).

Of particular interest to the field of education is *readiness to learn*. In higher education, the readiness of *adults* for learning is of particular interest. Specifically in the area of adult learner readiness, a search of the literature revealed several closely related concepts, including self-learning, self-directed learning, and learner types, which are all important aspects of adults' readiness to learn. For example, Shani and Lau (2000) noted that "… self-learning is related to self-motivation, self-awareness, and self-control. It presupposes that learners are interested in learning. Further knowing oneself and having the ability for planning and a sense of commitment seems critical" (p. 274). Self-directed learning is defined by Knowles (1990) as learning wherein "…individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals,

identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). Whereas self-directed learning requires a level of learner readiness, it also includes additional components such as diagnosing learning needs.

As higher education institutions increasingly incorporate online learning into their strategic initiatives, factors contributing to success in this environment have become increasingly important. For example, in the environment of online learning, self-direction might be logically expected to be an important factor, given the nature of the requirements for learning via technology, which frequently entails independence and even isolation. Some researchers have suggested that technology access and skills, self-efficacy, family situation, and other factors also might contribute to success in the online learning environment. For whatever reasons, many online learners are not successful or failure as evidenced by the low retention rates frequently reported for online classes (Aragon & Johnon, 2008; Allen & Seaman, 2013; Boston & Ice, 2011; Glazer & Murphy, 2015; Harrell & Bower, 2011; Patterson & McFadden, 2009). This situation suggests additional study of readiness for online learning is warranted.

One relevant variable in adult learning readiness is *learner types*. In the research literature, one can find articles both supporting (e.g., Duff, 2004; Felder, 2010; Felder & Spurlin, 2005; Pritchard, 2013) and refuting (e.g. Coffield, Mosley, Hall & Ecclestone, 2004; Dembo & Howard, 2007; Pashler, McDaniel, Rohrer, & Bjork, 2008; Rezaei & Katz, 2004) the importance of learning types and their relationships to learning, and there are several different conceptualization of learning types and instruments to determine them. While these can be helpful tools for students, their relevance is inconsistent in the research literature and

they do not take into account the other variables frequently cited as needed for online learning readiness such as technology skills and motivational levels. Therefore, for this study, the concept of learner types was not addressed. Rather, for the purpose of this study, the researcher focused directly on the concept of online learner readiness in adults in a formal learning environment and several of its components as identified in the research literature.

All different types of readiness require some type of individual preparation. This could include new knowledge, abilities, and/or skills. Educational readiness, and online learning readiness in particular, is no different. As higher education moves into offering more and more online classes, colleges, universities, and other institutions will need to better prepare students for the change. This need provided both the researcher's interest and the impetus for this study.

Researcher's Perspective

During the past fifteen years as a full time employee at Tulsa Community College, the researcher has held several different roles within the institution, all of which contributed to her current interest in online learning and the readiness of adult students to succeed in this environment. These roles have included both academic and student service positions. For twelve years, the researcher worked in student services with direct contact with students and faculty. While in this position, the researcher spent considerable time mentoring and guiding students in clubs and organizations. Also included in the researcher's duties was new student orientation which tied in advisement and registration. Currently, the researcher has spent the past three years as an Academic Division Administrator for the Science and Mathematics Division at the Southeast Campus of Tulsa Community College. In addition to the full time positions, the researcher has been teaching a variety of classes in several divisions for over

nine years. These classes have been offered in several different formats including blended, completely online, and traditional face-to-face courses. Additionally, during this time the researcher has held various positions on committees within Tulsa Community College and the state of Oklahoma. These experiences have covered a variety of topics including student orientation development and integration, the grade appeals process, online course development, distance learning issues within the college, and academic strategies development. The researcher currently works as a full time administrator in one of the large, academic divisions at Tulsa Community College. As a Division Administrator, the researcher started looking at online classes and their persistence or completion rates. This interest pushed the researcher to examine issues that might relate to observed persistence problems and retention rates in online classes.

After examining past publications and dissertations, the researcher realized that many student factors frequently included in studies of academic achievement seemingly had no observable relationship to success in online classes. Some of these seemingly irrelevant factors include gender, age, income level, and academic subject (Argon & Johnson, 2008; Doherty, 2006; Park & Choi, 2009; Willging & Johnson, 2009). A few of the factors examined in the literature that did appear to relate to success in online courses involved past course history, technology experience, motivation, and support (Byrd & MacDonald, 2005; Harrell & Bower, 2011; Smith, Murphy, & Mahoney, 2003; Watkins, Leigh, & Triner, 2004). This discovery led the researcher to examine currently used instruments/tools involving online learner readiness which were intended to indicate success in online courses. It was reasoned that if the college could identify an instrument that demonstrated a significant relationship to students' success in online courses and was, at the same time, easy

to obtain and efficient to administer, this would give the administration and faculty a tool to help identify students who might be at risk and provide them extra support and/or resources. This line of inquiry and its potential for positive contribution to student success was the researcher's motivation for this study.

Theoretical and Conceptual Framework

Background and Definitional Information

Before determining a sound theoretical framework for a study of online learner readiness, it was necessary to define the term. This task was not as straightforward as it appeared. The researcher discovered that in the literature, there are many references to *online learner readiness* in journals, articles and dissertations; however, there are very few actual definitions of online learner readiness. Many authors and researchers use the term in their research but never clearly define online learner readiness. This lack of clear definition may be attributed to assumptions that researchers and practitioners know what online learner readiness is or researchers may want to use the terminology vaguely to avoid clear explication of variables, instrumentation, or theory base. This lack of definition in previous research can make it difficult to pinpoint what an individual needs to be ready to learn or what type of skills they should have. In addition, there are many types of learner readiness even within the field of education. Some of the definitional information regarding online learner readiness uncovered by the researcher is presented here to illustrate the information base used to develop the theoretical framework for this study.

The actual term *learner readiness* has been used for many years, but study of the literature suggests that researchers seem to have become more aware of the term and what it means in the 1970s as research on learning became more systematic and disciplined. During

this time, there were several studies on educational learner readiness that emerged in literature. For instance, in his classic book on learning, Gagne (1977) noted that the *conditions of learning* attributable to the adult learner in a learning situation include innate academic ability, previous preparation from secondary education, and various motives and incentives learners bring to their collegiate experience. In addition, in this same time period Guglielmino (1977) researched and developed an instrument for self-directed learning readiness for her dissertation. Looking at these past studies, many of the identified attributes appeared to this researcher to remain valid today and were considered in developing several aspects of this study.

The *Oxford Dictionary* (Readiness, 2014) lists readiness *as the state of being fully prepared for something or the willingness to do something.* When combined with learning, learner readiness can be interrupted as the state of being both fully prepared and willing to learn. This definition, although simple, captures the essence of learner readiness. In the literature, learning readiness has been defined as the "possession by the learner of the requisite emotive-attitudinal, cognitive, behavioral characteristics, skills, and orientations needed to be a successful learner" (Maddox, Forte, & Boozer, 2000, p. 273).

Additionally, several subsets of learner readiness have been identified. Researchers frequently specify the *education level* of the readiness. For example, Wynn (2002) described student readiness as the things that help children be successful in school. This involves the skills and abilities that children have and the readiness of the school to meet the needs of the individual child (Wynn, 2002). Wynn was looking at students in an elementary school setting. On the other hand, college readiness represents a different subset involving student characteristics and the needed skill sets for college (Byrd & MacDonald, 2005). Although

both require skills, the two age groups have different required skills. The skills and abilities at the college level is at a higher level of thinking and skill than what is required or needed for kindergarten readiness.

There are also specific *types of learner readiness* such as that for online and distance education, which is the readiness of interest to this researcher for the study reported here. Current definitions of *online learning readiness* examine time management skills and an individual's level of self-directed learning which is important for online classes. Readiness also includes knowing and understanding one's learning style and combing that style with their past experiences (Pillay, Irving, & Tones, 2007). Another definition of online learner readiness adds a technical component. Proffitt (2008) stated that online learner readiness is a combination of learning style, individual attributes, technical competency, reading comprehension, and typing competency.

Warner, Christie, and Choy (1998) proposed the concept of readiness for online learning and training sector, defining it by three aspects. These aspects are: (1) students' preferences between online learning and face-to-face instruction; (2) student self-efficacy in in communicating electronically and technology combined with web self-efficacy; and (3) autonomous learning abilities.

Throughout this range of readiness environments and proposed components, there is a constant: the direct relationship of readiness to learning. Throughout the readiness literature, the concept of readiness is consistently tied to learning. This relationship is summarized by Aicinena (1992) in the assertion that implicit in the concept of readiness is the notion that learning is more rapid and more enjoyable when appropriate readiness is present. This

relationship provides the basis for the theoretical framework for this study of adults in a formal online learning environment.

Theoretical Framework

In quantitative studies, the practice of combining related theories to build new frameworks is highly supported and frequently used (Camp, 2000). Camp identified a theoretical frame or theoretical framework as *a theory or a set of several related theories* that form a conceptual starting point for a study and lead to research hypotheses, or a set of theoretical assumptions that explain proposed relationships among variables or phenomena. This quantitative study followed Camp's approach and used more than a single theory to frame complex human behavior. Jaccard and Jacoby (2010) supported novelty and creativity in combining theory into new models, identifying creativity as a criterion for evaluating a proposed theory and favoring theories that provide "… novel insight into an interesting phenomenon" (p. 32). Lovitts (2005) reported a national study of 272 experienced university faculty from nine research universities who had advised more than 3000 dissertations. These faculty research advisers stressed that very good and outstanding dissertations present original ideas and insights, either methodological or theoretical and use standard theory effectively and/or have strong points of view that are theoretically sophisticated and offer novel approaches to theory.

For the theoretical framework for the proposed study, the researcher combined two theories from Knowles and Bandura in a proposed novel theoretical model, as illustrated graphically in Figure 1. This dual-theory framework provides integration of components of Knowles' adult learning theory and Bandura's social-cognitive theory in an environment and

a process that is proposed to contribute to learning readiness, which then contributes directly to learning.

The environment or context for this study is the community college. Thus, the population of interest is adult learners. This leads directly to the necessity to include the characteristics of adult learners and adult learning theory in the theoretical framework for the study. In this study, adult learning is represented by the theoretical position of Knowles (1973) on adults and their learning characteristics and needs. The main characteristics of adult learners according to Knowles' Theory of Andragogy are experience, self-concept, orientation, need to know, and readiness. According to Knowles, experience involves using prior knowledge, activities, and encounters as a resource for future learning. Self-concept embraces the individual's change from total dependency to self-dependency and self-direction. Orientation focuses on adults' motivation to learn new information. This information allows them to handle future tasks or problems. The need to know focuses on how the information, skill, or task being learned will benefit the individual, and readiness occurs when the adult is ready to take on new social roles. For the purpose of this study, the researcher has combined the need to know and readiness together and proposed the conceptualization of adult learning shown in Figure 1.

The Knowles adult learning/andragogy theory emphasizes the *experience* brought to learning environments by adults. This experience concept is also addressed by Bandura's Social Cognitive Theory (1999), which provides a conceptual link between the two theoretical strands. While Bandura's theory is complex, one important aspect is its emphasis on the social and experiential nature of human motivations and behaviors. This is proposed by this researcher to be fundamentally related to the adult learning model proposed by

Knowles, and was therefore integrated with andragogy to form the original proposed model that formed the theoretical framework for this study.

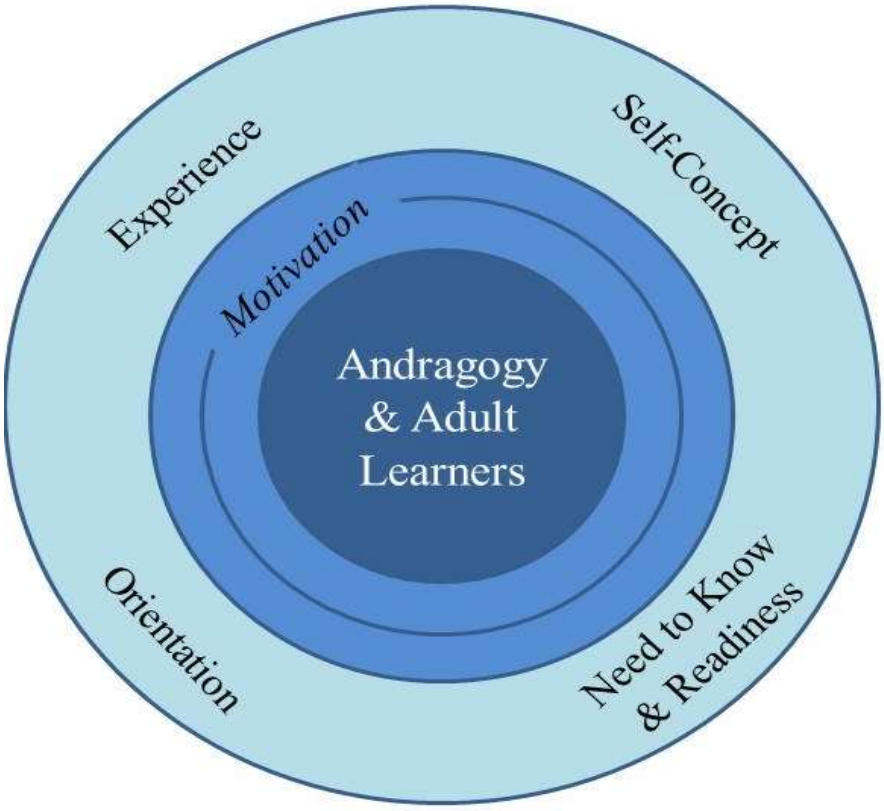

Figure 1. Researcher's' Adaptation of Knowles' Theory on Andragogy & Adult Learners

Bandura believed that direct reinforcement as in the Skinnerian Behaviorist model did not account for all types of learning. He proposed that "… individuals function as contributors to their own motivation, behavior, and development within a network of reciprocally interacting influences" (Bandura, 1999, p. 169). Bandura's Triadic Reciprocal Causation Model intertwines this network of personal, environment, and behavior factors. From this belief, Bandura developed his Social Cognitive Theory. Bandura's Social Cognitive Theory revolves around three main components. The first portion states that individuals can learn through observation and retention. Next is the notion that an individual has the knowledge and skill set to reproduce the learned skill or behavior. The last

component requires an individual to be ready and motivated. This requires a reason to imitate the learned skill or behavior. “In this view, people are self-organizing, proactive, self-regulating, and self-reflecting. They are contributors to their life circumstances not just products of them” (Bandura, 2005, p. 1). This researcher proposes that these concepts from Bandura’s theory can be related directly to the characteristics of adult learners offered by Knowles in their attention to individuals’ orientation, experiences, self-concept, and motivation. It is further proposed that when the components of the two theories are integrated, they relate directly to readiness to learn and thus to learning itself. This proposed theoretical framework is discussed further below.

Goal realization as part of Bandura’s Social Cognitive Theory can be broken down into the four processes: self-observation, self-evaluation, self-reaction and self-efficacy. Each of these four processes are interconnected. Overall they effect both motivation and goal attainment. Self-observation is required to start the process. In this first step, an individual views an action or behavior taking place. Although this step is necessary, self-observation requires motivation which is fueled by expected outcomes and efficacy (Zimmerman & Schunk, 2001). The next process is self-evaluation which requires an individual to examine his/her current performance in regards to personal future goals. Schunk and Zimmerman (1994, p. 3) state that "…specific goals specify the amount of effort required for success and boost self-efficacy because progress is easy to gauge."

When individuals put forth effort to achieve goals, they experience a level of satisfaction. In order to maintain this feeling of achievement and satisfaction, an individual will need to rise to that same level again (Bandura, 1989). This leads directly into self-reaction. Self-reaction requires an individual to examine their goals and their level of

achievements. If their goals and achievements aren't aligned, the individual will either need to raise their achievement level or lower their goals (Bandura, 1989). These reactions can be positive or negative. Both types of reactions can push individuals to worker harder to achieve their goals. All these processes require one essential component: self-efficacy. An individual can be motivated by one's belief in goal completion (Van der Bijl & Shortridge-Baggett, 2001). "Self-efficacy refers to people's judgments about their capability to perform particular tasks. Task-related self-efficacy increases the effort and persistence towards challenging tasks; therefore, increasing the likelihood that they will be completed" (Barling & Beattie, 1983, p. 46).

As the theoretical framework for this study, the components of Knowles' Andragogy Theory of Adult Learning and the goal-realization components of Bandura's Social Cognitive Theory were combined and integrated into a proposed theory model, using a theory-building approach suggested by Jaccard and Jacoby (2010). This dual-theory framework is illustrated in Figure 2. The main points in the combined figure involve Knowles' theory. Woven between the assumptions of the andragogy model are components of Bandura's theory. The proposed theory model depicted in Figure 2 asserts that between need to know/readiness and self-concept comes self-observation. Self-observation involves taking information and motivation to move towards goals. This may require some behavioral changes to get to the goal. Between need to know/readiness and experience is self-evaluation. This process involves taking a look at where one has been and where one is going to direct future movements. It requires a look at past experience and the bigger picture. Self-efficacy can be found between self-concept and orientation. The skills and knowledge from orientation combined with self-concept can booster belief in oneself. Then self-reaction

comes between experience and orientation. This involves taking a look at past experiences and using problem solving skills to move forward. The circular portion on the left side of Figure 2 illustrates this proposed framework.

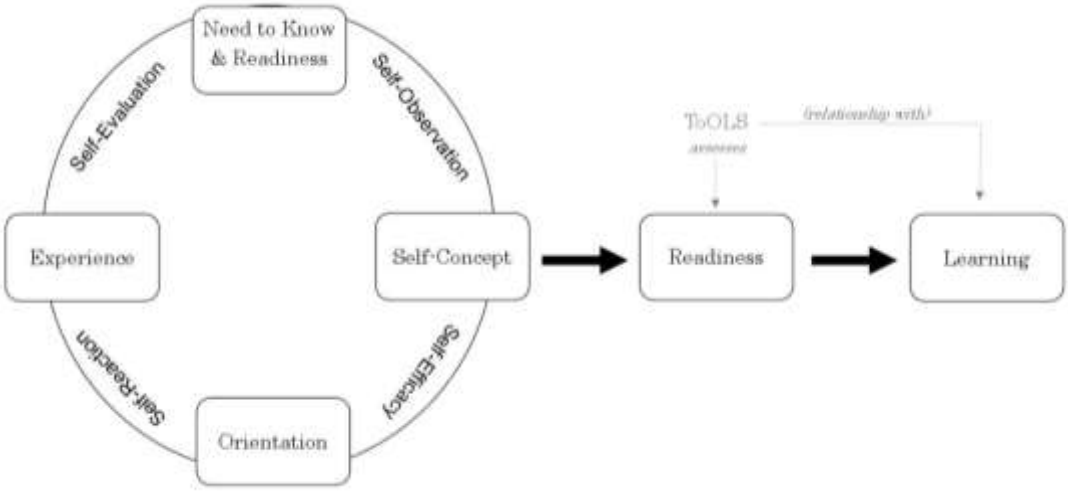

Figure 2 Theoretical framework combining Bandura and Knowles

It is next proposed that the social/cognitive process of Bandura's theory acting on the characteristics of adult learners from Knowles' andragogy produces readiness to learn, as shown on the right side of Figure 2. Finally, the presence of readiness contributes to actual learning outcome, as shown on the far right of Figure 2.

The *Test of Online Learning Success* (ToOLS) (Kerr, Rynearson, & Kerr, 2006) instrument, which was assessed in this study, fits into this framework by relating it to readiness for online learning. Specifically, ToOLS tests five categories; academic skills, independent learning, dependent learning, the need for online learning, and computer skills. If ToOLS is a successful instrument for assessing this readiness, then it should relate to observed successful outcome in an online class. This study examines ToOLS from this perspective.

The proposed theoretical framework for this study comprises both *process* – shown in the circular theory model on the left side – and hypothesized *outcome* – shown on the right side. The study focuses empirically on the outcome portion of the framework by examining the proposed relationship between readiness and learning performance in online courses. It is beyond the scope of the study to test empirically the proposed process model. However, should the model produce the hypothesized outcome, that would serve as an indicator that the theoretical process model merits further investigation in future research. This stance is supported by Camp (2000) in his discussion of relationships among research, theory, and empiricism in quantitative research and by Jaccard and Jacoby (2010) in their extensive work on theory construction and model building.

Conceptual Framework for Online Learning Readiness Variables

The conceptual framework for the readiness variables in this study presents the researcher's conceptualization, based on a review of literature, of the variables involved in online readiness and their interrelationship. There are a number of variables involved in online learner readiness. For the purpose of this study, the researcher has broken them into four distinct categories, shown in Figure 3.

The first category of variables in the conceptual model shown in Figure 3 involves academic skills and abilities. This category could also be referred to as college readiness skills and abilities. It includes academic skills such as assignment completion rate, note taking, test taking skills and time management (Dray, Lowenthal, Miskiewicz, Ruiz-Primo, & Marczynski, 2011; Glazer & Murphy, 2015; Kerr et. al, 2006; Michinov, Brunot, Bohec, Juel & Delaval, 2011; Schrum & Hong, 2002). This takes into account previous college experience, previous online class experience, learning styles and grade point average (GPA).

It also includes self-advocacy and communication (Alshare, Freeze, Lane & Wen, 2011; Aragon & Johnson, 2008; Gaytan, 2015; Harrell & Bower, 2011; Kaymak & Horzum, 2013; Yukselturk & Top, 2013). Communications is a big portion of this variable category relating to online learning interactions, whether by Internet platform, phone, or email.

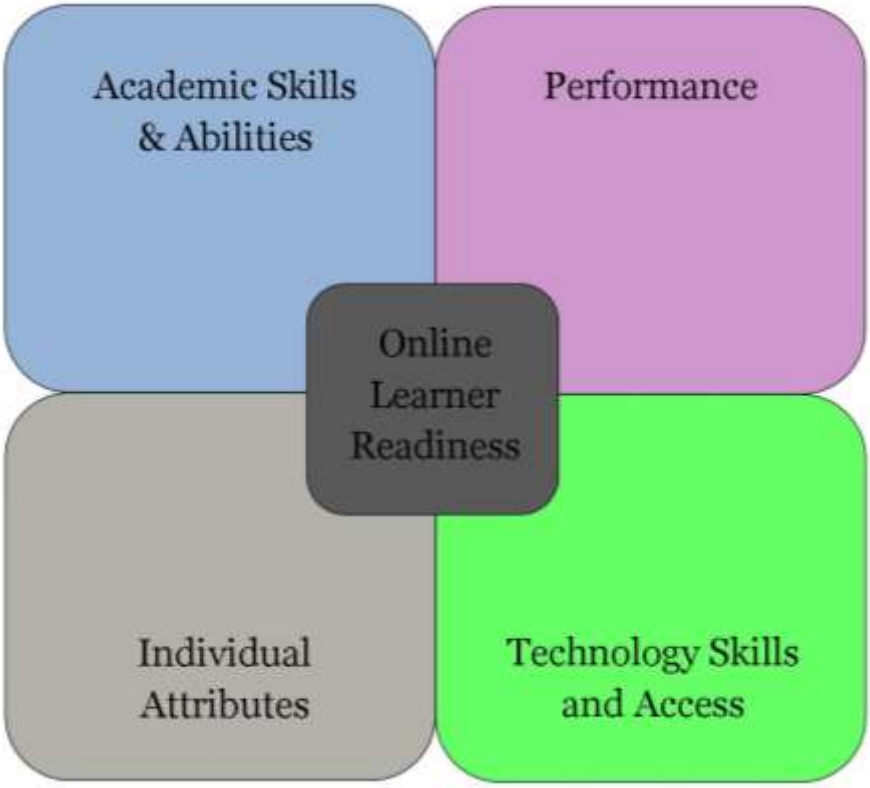

Figure 3 Conceptual Model for Online Learner Readiness

The second variable category is performance. Included in this category are a student's attitude towards school, online classes, and the subject matter. It also entails achievement in a current class and in past classes. The biggest portion of this category is motivation and self-efficacy, both of which play a big role in this grouping (Alshare, Freeze, Lan & Wen, 2011; Kaymak & Horzum, 2013; Keramati, Afshari-Mofrad, & Kamrani, 2011; Yukselturk & Top, 2013).

The third category is technology skills and access. This involves the availability and stability of a student's Internet connection. This directly relates to the student's access and availability to the technology itself. Even though technology comes in many forms such as phones, computers and tablets, and Internet connections that can be found in many places like homes, workplaces, restaurants, stores and libraries, this does not mean that students know how to perform essential online classroom skills. This category examines if the student has the ability to surf the Internet, research online, send an email and/or attach a file. These are all essential skills required for online learning readiness (Calvin & Freeburg, 2010; Harrell & Bower, 2011; Kaymak & Horzum, 2013; Keramti, Afshari-Mofrad & Kamrani, 2011).

The fourth category of readiness variables in this study revolves around individual attributes. Individual differences are the focus on innumerable studies in the research literature. In this study, the variable class will take into account time commitments and support/expectations. Encompassed within time commitments are the number of hours students work, their family obligations and their social commitments. The other side looks at the support student receive from their family, friends and work setting. Career expectations can be found in this category and often hint at performance or more specifically motivation.

Background variables are also included in the individual attributes category. These variables involve general background information and demographics. General background information will include age, gender, ethnicity, the number of hours the student works per a week, and relationship status. Educational variables such as placement in developmental courses, the number of online college courses previously completed, and their student status will also be in the demographics section.

In this study, the four readiness variable categories presented in this conceptual framework are measured by the two instruments that were used. Variables in all four categories are covered by the ToOLS (Kerr, et. al., 2006) instrument and the demographic survey developed for the study. It is proposed as a working hypothesis for the study that the learner characteristics measured by ToOLS and the selected demographics will provide an operational definition of readiness for online learning that will demonstrate a relationship with adult students' learning performance in online courses in a community college environment as shown in the theoretical framework illustrated in Figure 2.

Statement of Problem

The problem for this study is a current lack of understanding of student barriers to online learning success and a thoroughly evaluated instrument for helping identify which students may be likely to encounter difficulties in this learning environment. It is clear in the research that increasing numbers of colleges and universities are adding online classes or programs. The proportion of students taking at least one online class was reported by Allen and Seaman in 2013 to be 32% and the number continues to increase each year. However, despite rapid growth in online courses in higher education, little research has been conducted within this environment on a student's level of readiness and technical skills. Both of these are required by students to attain academic achievement and self-satisfaction. This omission was reported by Pillay, Irving, and McCrindle (2006) a decade ago, and there is little evidence in current literature that it has improved. Despite the increasing number of online opportunities made available, anywhere from 50% - 70% of the students have been reported as not successfully completing online courses (Hannum, Irvin, Lei, & Farmer, 2008). To address this problem, it is essential that higher education identify relevant readiness

assessments to identify student barriers and put initiatives in place to help remove or guide students through these barriers. One way to accomplish this is to find an instrument that assesses student learners' readiness to partake in an online course or program. Analysis of one available instrument – known as ToOLS (Kerr, et. al., 2006) – defined the problem for this study.

Purpose of the Study

The purpose of this study was to analyze the efficacy of the ToOLS (Kerr, et. al., 2006) online readiness instrument as a potential indicator of community college students' success in online courses. The analysis of the ToOLS instrument included its psychometric properties, its coverage of online readiness issues identified in the literature, and the relationships of its scores to grades attained by students in online courses.

There are currently a number of surveys/tools being used to identify learner readiness at various levels of success. After much research into different options, the researcher chose the *Test of Online Learning Success* (ToOLS) (Kerr, et. al., 2006) instrument. ToOLS had some credentials which suggested it was an appropriate instrument for analysis. It was previously shown to be a reliable indicator for success in online classes at four year universities (Kerr, et. al., 2006). The ToOLS instrument also has the advantage of being appropriate for administration via the Internet as a Likert-type survey with a consistent scoring protocol, which would be beneficial to practitioners in a college environment who might choose to use it.

However, some aspects of ToOLS (Kerr, et. al., 2006) required further examination before recommending it to educators. Therefore, to further delineate the properties of the instrument for potential users, detailed information regarding the development and validation

of the ToOLS instrument and its psychometric credentials were presented and further analyzed in this study.

The instrument-analysis purpose of this study has merit on several counts. By using an appropriate and validated online learner readiness instrument, a college can identify students with potential challenges before they take online courses or at the beginning of the online course. This would allow several things to happen. First, faculty members could be aware of students who might not have all the skills needed to succeed in online courses. By knowing this information upfront, faculty can check on these students more frequently and lend a greater level of support to struggling students. Secondly, the college can offer resources to these students to help them build their skill set in deficient areas as identified by the instrument. A third option would be to advise a traditional class option for students scoring poorly on the instrument. Through these options and their corresponding support opportunities for student advising, there should be an increase in student success in online courses. This study addressed these possibilities by analyzing the ToOLS (Kerr, et. al., 2006) instrument and its efficacy for assessing learner online readiness.

Research Questions

General Research Questions

This study was guided by the following general research questions:

1. To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have content validity?
2. To what extent is ToOLS a reliable instrument for measuring online learner readiness?

3. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?
4. To what extent do ToOLS scores relate to demographic variables of students in online classes?

Specific Research Questions and Hypotheses

To guide and facilitate statistical analysis and hypothesis testing to address the general research questions, specific research questions and quantitative empirical hypotheses were developed. These specific questions and hypotheses enabled statistical testing to report the study's findings in Chapter IV. They also provided an organizational structure for reporting the findings. All specific questions and statistical hypotheses are listed in Chapter III (Methodology) and addressed in Chapter IV (Findings).

Research question 1 was addressed through content comparison of available literature with coverage presented in ToOLS (Kerr, et. al., 2006). Question 2 was addressed with factor analysis, coefficient alpha, and test/re-test Pearson correlation. Question #3 was tested with *t*-tests and one-way analyses of variance, with grade categories as the independent variable and ToOLS scores as the dependent. Question #4 used 2-way chi-square analyses to compare distributions of demographic variables across grade categories. Details of data analysis choices are presented in Chapter III, Methodology.

Definition of Key Terms

Conceptual Definitions

Bandura's Social Cognitive Theory (1986): While this theory is complex, one principle aspect of the theory, which forms part of the framework for this study, centers around people learning by observing others and modeling the observed actions and behaviors for later use.

This takes into account behavior, environmental, and personal factors. The theory is modeled on a four-step process resulting in goal realization which involves self-observation, self-evaluation, self-reaction and self-efficacy (Bandura, 2005).

Knowles' Theory of Andragogy and Adult Learners (1973): Knowles used his theory of Andragogy and Adult Learners to describe the point at which individuals believe they have psychologically become adults through the achievement of self-concept and self-direction (Knowles, 1973). It identifies the characteristics of adult learners who have achieved this status. The model is based on the concepts of need to know, self-concept, experience, readiness, and orientation. These concepts, all of which characterize adult learners, combine to form their motivation for learning.

Learner Readiness: This concept refers to an individual having five different characteristics which include: emotional intelligence, cognitive, behavioral characteristics, technical skills, and orientations needed to be a successful learner (Maddox, Forte, & Boozer, 2000).

Operational Definitions

Academic Skills: This category of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes self-direction, reading levels, writing skills, and need for interaction. In this study, the variable is defined as total score on the Academic Skills section on ToOLS.

Class Completion: This refers in this study to completing the course regardless of the grade being earned in the course.

Class Success: This refers in this study to completing and earning a passing grade in the course being taken. At Tulsa Community College, a C is required to move on to the next course in the series and thus will be the requirement for class success in this study.

Computer Skills: This set of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes current technology skills, ability to learn new skills, and ability to maneuver online course features. In this study, the variable is defined as total score on the Computer Skills section on ToOLS.

Degree-Seeking Students: In this study, this refers to students who are seeking a certificate, an Associates of Applied Science, or an Associate degree. This includes students who are undecided on their major but they will be seeking a degree. Students who are undecided choose 'Undeclared' as a major. This differs from the other option of non-degree seeking.

Dependent Learning: This set of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes procrastination, comprehension issues, and lack of motivation. In this study, the variable is defined as total score on the Dependent Learning section on ToOLS.

Independent Learning: This set of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes time management, goal orientation, motivation, responsibility, and multitasking skills. In this study, the variable is defined as total score on the Independent Learning section on ToOLS.

Need for Online Delivery: This set of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes personal schedule with work and family and transportation problems. In this study, the variable is defined as total score on the Need for Online Delivery section on ToOLS.

Non-Degree-Seeking Students: In this study, these students are temporary students who many take up to nine hours, senior audit students, or concurrent high school students.

Online Learner Readiness: A set of skills, knowledge and abilities required to succeed in online learning; measured in this study by the ToOLS (Kerr, et. al., 2006) instrument.

ToOLS: *Test of Online Learning Success* (Kerr, et. al., 2006): ToOLS is a self-reporting instrument that was designed to measure several aspects of online learner readiness. It should be administered at the beginning of the online course or before enrolling in online courses to determine the appropriateness of online classes for students. ToOLS is the measure of learner readiness for online learning used in this study. ToOLS comprises 45 questions, divided into five sections; all questions are answered on a 6-point Likert-type scale.

Class Success: This refers in this study to completing and earning a passing grade in the course being taken. At Tulsa Community College, a C is required to move on to the next course in the series and thus will be the requirement for class success in this study.

Computer Skills: This set of attributes on the ToOLS (Kerr, et. al., 2006) instrument includes current technology skills, ability to learn new skills, and ability to maneuver online course features. In this study, the variable is defined as total score on the Computer Skills section on ToOLS.

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Overview of Study

This study used an online survey methodology incorporating students from an urban, multi-campus two year college located in Oklahoma. Tulsa Community College has four main campuses spread throughout the metropolitan area. The college also has a number of satellite locations that offer classes. The survey was administered to 6,983 students taking at least one online classes in the spring of 2015. Three hundred and ninety students started the online survey, but only 319 students completed it. Out of this group of students, a number

were immediately disqualified due to being under the age of 18, having previously taken the ToOLS assessment, or not giving permission to collect final grades. Additionally, students that withdrew from their only one online class were removed from the study. After removing those students, the researcher was left with usable responses from 157 students, who therefore comprised the sample for this study.

There were two parts to this study. The first portion of the survey was a set of demographic questions. These questions addressed identifiers such as age, gender, ethnicity, and school and work information. The demographic questionnaire was researcher- developed and the terminology used was identical to the identifiers used by Tulsa Community College. The second portion consisted of a previously developed instrument named ToOLS (Kerr, et. al., 2006). The ToOLS instrument reportedly measures students' readiness to take an online course. It was developed for a four year university and is currently in use at several colleges and universities throughout the United States. Thus, the ToOLS instrument has a history of research with online studies.

Data from the survey was collected over the spring semester of 2015. With permission from the students, final grades in their online classes from that semester were obtained and used as a dependent variable in the study. The independent variables consisted of the demographic variables and ToOLS (Kerr, et. al., 2006) scores collected in the study.

Limitations, Delimitations, and Assumptions

Delimitations

- This study was bounded by the following delimitations: The study was limited to students enrolled in online classes at Tulsa Community College. The college enrolled 17,199 students during the spring of 2015 semester (Planning and Institutional

Research, 2015). However, there were only 6,983 enrollments in the spring of 2015 semester in online classes (Planning and Institutional Research, 2015). Those were the unduplicated enrollment numbers. Due to this limitation, results may not be generalizable to other types of institutions such as four year schools, career and technical institutions, or rural community colleges. This delimits the external validity of the study

- The study was limited to online classes at Tulsa community College. The results may differ in traditional classrooms at the college.
- Students in the study's sample were over the age of eighteen and not a member of any type of special population noted by the Institutional Research Board (IRB). This was determined during the survey. Participants were asked about their age and special population status. If they self-identified into a special population or under the age of 18, the survey terminated, thanking them for their time. Thus, findings cannot be generalized to special populations or students younger than 18.
- The study was limited to undergraduate students. The results may differ in graduate level courses.

Limitations

The following limitations were accepted for this study:

- This study only examined student success at the course level. This course success was not an indicator of or tied to program or degree completion. It was solely indicative of the success rate of this single course.
- Participation in this study was voluntary and was not 100%; in fact the obtained sample was small. This may have resulted in a biased sample and biased results. This

issue was addressed by comparing the volunteer sample to characteristics of the known student and online student populations at Tulsa Community College. However, sample bias could not be ruled out, and bias may have affected the results in ways that could not be known by the researcher.

- This study did not provide cause and effect results from the variables studied, as it used a purely descriptive design rather than an experimental or quasi-experimental one. The study showed the nature of the relationship of its variables, but could not establish causality.
- The study was limited to students who gave permission during the original survey for collecting their end of semester grades. Lack of this permission limited the sample size and may have altered the nature of the collected data in ways that cannot be known by the researcher.
- This study did not take into consideration the difficulty level, the instructional design, or the interaction level within students' various online courses. These differences may have affected grade outcomes in these courses in ways unknown to the researcher which could have changed the assessment of the online readiness instrument used in this study.
- This study does not take into consideration the grading systems of the various online courses. To the extent they may have been unequal or different, this lack of uniformity may have affected the results of the study.

Assumptions

In this study, the following assumptions were made:

- Students were able to properly assess their current skill level and answer truthfully using a Likert-type scale.
- Students answered truthfully on the demographic questions in the survey.
- Students answered accurately regarding having participated in the ToOLS instrument in the past. This was determined via a question in the survey.
- Students were confident that their identities were kept confidential and anonymity was protected so that concern over this issue did not bias their responses. This assumption was supported by the fact that data was kept safely and securely by the researcher, which was affirmed to the Oklahoma State University IRB by the researcher and to participants in the informed consent information they received.

Rationale and Significance of the Study

Research has indicated that online classes frequently have a lower persistence and completion rate than face-to-face classes (Allen & Seaman, 2013; Aragon & Johnon, 2008; Boston & Ice, 2011; Glazer & Murphy, 2015; Harrell & Bower, 2011; Patterson & McFadden, 2009). As the number of online classes continues to increase, higher education institutions needs to find a way to increase these student success rates by identifying students who may not perform as well in online classes. By identifying these students, higher education can develop ways to encourage and support these students. This study examined whether the level of students' online learning readiness is related to their outcome in an online course. Based on readiness theory, the working hypothesis for the study favored a positive relationship.

The study also examined a specific instrument for assessing online learning readiness. For Tulsa Community College, and by extension for other similar institutions, the practical significance of this study will lie in gaining insight into the value of the ToOLS (Kerr, et. al., 2006) instrument, which they already possess. If ToOLS is determined to have value in relating to online learning readiness, the college will gain insights and increased understanding of factors related to student success in online classes. From the results, the study should also assist faculty in identifying students who may need additional support. For advisors, they would have a way to test students to see if online classes are likely to be an appropriate format for them at this time. Distance Learning Centers, advisors, and faculty would have a better understanding of the factors required to succeed and therefore would be able to develop resources and new proactive models for online students.

For research, this study's significance will be the advancement to the body of knowledge regarding online learner readiness in the community college environment. It will help provide a solid foundation for the knowledge and understanding of the ToOLS (Kerr, et. al., 2006) instrument at a community college. The study will also identify specific factors that have greater significance within the instrument. The study may also have significance in the realm of theory if it supports the notion of relationship between readiness and learning success in online courses. An additional theoretical importance may be outcome-based support for further study of the adult learning/social cognitive process framework proposed by the researcher for this study.

For students, this study can identify how well ToOLS (Kerr, et. al., 2006) relates to success in online classes. Successful results in this area would allow students to self-examine

before attempting online classes. The instrument could point students to possible problem areas and help identify resources they would need to succeed in this class format.

Dissertation Organization

This chapter has introduced the study presented here, including its background, problem, purpose, theoretical/conceptual framework, research questions, delimitations/limitations/assumptions, and significance. In Chapter II, past literature and related studies are reviewed, including information about different types of readiness and online learner readiness. Chapter II also provides the information used to assess the content validity of ToOLS (Kerr, et. al., 2006) in this study's findings. Chapter III presents a detailed description of the methodology used to conduct the study and the types of data analyses conducted on the data from the study's survey. The analysis and results from this data are presented in Chapter IV. Additionally, the ToOLS instrument is evaluated in Chapter IV to see if it fully covers the indicators found in literature. The last chapter, Chapter V, lays out the conclusions and recommendations arising from the study and also suggests further research indicated.

CHAPTER II

LITERATURE REVIEW

Introduction

According to Allen and Seaman (2015), “increasing numbers of academic leaders think that retaining students is a greater problem for online courses than for face-to-face courses (44.6% in 2014 versus 40.6% in 2013, 28.4% in 2009, and 27.2% in 2004)” (p. 6). Growth in concern for the quality and content of online courses has been accompanied by rapid growth in the number and variety of online offerings, and these twin concerns continue to increase. An important aspect of concern focuses on the retention of students or persistence of students in online classes. The research literature indicates that at least part of the student persistence problem in online course is believed to be due to readiness factors and needs to be examined by higher education in hopes of assisting students in their pathways, situation that provided significant motivation for this researcher to conduct the present study. The literature on learner readiness for online learning has identified many factors that may contribute to readiness, and these factors are the focus of the review of literature presented in this chapter.

In this chapter, the researcher summarizes a multitude of literature surrounding online learning specifically in the context of higher education. The goal of the chapter is to examine literature related to these topics for a better understanding of online learning,

readiness issues, and online learner readiness factors. In addition, this review of literature briefly reviews theoretical perspectives used in this study and the ToOLS (Kerr, et. al., 2006) instrument used in this study. The review of literature beings with theoretical perspectives, then moves to the concept of readiness and readiness factors for online learning, and concludes with information about the ToOLS instrument

Theoretical Perspectives Applied in this Study

Theoretical Considerations for this Study

Theory and theory building are important components in quantitative studies. The researcher engaged in multi-factor theory building in this study to support the role of theory in learner readiness for online learning and to start to build a framework for online learner readiness. Relevant concepts are presented in this section of the literature review.

Approach to Theory in this Study

In this study, theory was approached as a multi-faceted concept, and theory building was an important component. According to Camp (2000), the practice of combining related theories to build new frameworks is highly supported and frequently used in quantitative studies. As stated in Chapter I, theory combining was employed in the present study to address the complex phenomenon of learner readiness for online learning. The study was supported theoretically by a novel combination of two well-known theories, both of which are described below as well as in the theoretical framework presented in Chapter I.

As a relatively young field in research, online learner readiness doesn't have many established theories surrounding it. The literature indicates absence of a clearly-identified body of theory that is used consistently in studies of online readiness. Saba

(2013) pointed out that this lack of defined and tested theory presents a barrier for both researchers and practitioners in studying the phenomenon and in designing effective online learning experiences. Theories or theoretical frameworks are an important conceptual starting point in research; however, when there is a current lack of theories in the subject area, researchers need to build and propose theories. This theory building therefore becomes an important and deliberate research activity that helps bridge understanding between concepts and ideas and the empirical data observed in real-world environments (Jaccard & Jacoby, 2010). The process of theory-building provides an avenue for understanding and predicting phenomena in ways that explain complex interconnections between many components in a bigger system (Dubin, 1978; Kettley, 2010). It can involve proposing new theories or combing older theories in new combinations. The process of theory building by a novel combination of known theories into a proposed model that offered both processes and outcomes related to online learning readiness and its effects on learning success in online course was the theoretical approach used in the present study.

Theoretical Framework Components for this Study

For the theoretical framework for the proposed study, the researcher combined two established theories from Knowles and Bandura. These theories are proposed as a novel theoretical model by integrating components of the two to create a process that is proposed to contribute to learning readiness, which then contributes directly to learning.

Bandura's Social Cognitive Theory

Bandura developed his social cognitive theory based on the concept that learning is affected by cognitive, behavioral, and environmental factors (Bandura, 1991) found in

a naturalistic setting. He proposed that these factors could be internal or external and that they motivated and/or influenced individuals in different ways. According to Gibson (2004), Bandura's theory indicates that learning happens through a three- way relationship and interaction between a learner's behavior, the environment, and the cognitive or personal "… events inherent in the individual learner" (p. 197). Crothers, Hughes, and Morine (2008) asserted that, for Bandura, human behavior results from the interaction among the three factors as depicted in his Triadic Reciprocal Determinism model (Wood & Bandura, 1989). Bandura (1999) stated that this model of personal, environment, and behavioral factors intertwine with one another focusing on "… individuals functioning as contributors to their own motivation, behavior, and development within a network of reciprocally interacting influences" (p. 169). The Triadic Reciprocal Determinism model emphasizes social influences and reinforcements, both internal and external, but notes that among these multiple influences, not all factors are of the same strength or carry the same weight (Bandura, 1999. Wood & Bandura, 1989).

From the Triadic Reciprocal Determinism conceptualization of human behavior, Bandura developed his Social Cognitive Theory (SCT). This theory places an emphasis on the need for a reason to imitate a learned skill or behavior. Bandura maintained that "In this view, people are self-organizing, proactive, self-regulating, and self-reflecting. They are contributors to their life circumstances not just products of them" (Bandura, 2005, p. 1).

Bandura's Social Cognitive Theory theory can be broken down into the four processes (Bandura, 1999), each of which have been discussed by Bandura and by other theorists as follows:

- Self-observation: In this initial step, an individual views an action or behavior taking place. This step is required to start the entire learning process, so the step is necessary but is not sufficient alone due to its dependence on motivation. This motivation may stem from one's expectations of outcomes and/or level of self-efficacy (Zimmerman & Schunk, 2001).
- Self-evaluation: In this step, an individual needs to examine his/her current performance in relationship to personal future goals, which should be specific and important to the individual. Schunk and Zimmerman (1994) stated that specific goals are important because they indicate how much effort will be required for success and when achieved they will boost self-efficacy. They explained that these goals can be divided into two categories: absolute and normative. An example from the normative category is a social comparison such as measuring one's behavior or performance against that of other people (1994). According to Bandura (1989), individuals gain satisfaction by achieving valued goals. The rationale is that when people achieve valued goals, they are more likely to continue to put forth an effort, because poor results no longer gives them the same level of satisfaction.
- Self-reaction: In this step, individuals re-evaluate their goals in comparison to their attainments. The importance of this evaluation is that it either causes pride

and/or self-efficacy in achievement or provides motivation to do better if the evaluation isn't as good hoped (Bandura, 1989).

- Self-efficacy: When this final step is reached, an individual's belief in the likelihood of reaching his/her goals can be motivating (van der Bijl & Shortridge-Baggett, 2002). Self-efficacy is related to further goal achievement because it "… refers to people's judgments about their capability to perform particular tasks. Task-related self-efficacy increases the effort and persistence towards challenging tasks; therefore, increasing the likelihood that they will be completed" (Barling & Beattie, 1983, p. 46).

All four of these steps or processes in Bandura's SCT emphasize self-direction and self-regulation as they relate to learning. This self-directional aspect of learning was the characteristic of the SCT that was of relevance to the theoretical framework constructed for this study. It was the bridge and uniting element between the SCT and Knowles' theory of adult learning which was the second component of this study's proposed theoretical framework. Further details regarding the Bandura and Knowles theories and their use in this study are presented in Chapter I where the study's theoretical framework and the theory-building process behind it are detailed. In summary, these four processes from Bandura's theory played an important role in the theory building incorporated into this study. They were woven together and combined with Knowles' theory of andragogy and adult learning to propose a process that contributes to online learning.

Knowles' Theory of Andragogy and Adult Learning

Considered by many to be the founding father of adult learning, Malcolm Knowles focused his theoretical lens on the field of adult learning, specifically supporting

the position that adults and children learn differently. His research started in 1975 with his book *Self-Directed Learning* and spanned over multiple decades to become widely accepted as the foundational theoretical position in the field of adult learning and education, where it has become generally known as andragogy, or the art of teaching adults, as distinguished from pedagogy, or the art of teaching children (Knowles, 1980). Knowles (1990), himself an adult educator, acknowledged the long history of adult education but also maintained that little formal work had been done in the theoretical foundations of the field when he began is work. Both stances are clear in his statement that while " … the education of adults has been a concern of the human race for a very long time, it is curious that there have been so little thinking, investigating, and writing about adults learning until recently" (p. 27).

Knowles' original studies and writings were grounded in the belief that there are specific and important differences between learners of different ages. According to Knowles (1980), differences between adult and younger learners relate primarily to adult learners being more self-directed. This is due to adults' accumulation of life experience, and their level of internal motivation to learn applicable subject matter. Merriam and Caffarella (1999) stated that adult learning principles are particularly relevant to learning that is "… closely related to the developmental tasks of his or her social role" (p. 272). Knowles' characteristics of adult learners pertain directly to the student population at a community college, which was the population of interest in the present study. While this population often spans a diverse age group, its members are generally considered to be adults in the sense identified by Knowles' concept of andragogy. This situation

positioned andragogy and adult learning a critical component of the theoretical framework for the present study.

As mentioned above, Knowles (1980), described adult learning through the concept of andragogy, meaning " … the art and science of helping adults learn," and contrasted it with pedagogy, or "… the art and science of helping children learn" (Merriam & Caffarella, 1999, p. 272). Knowles (1980) asserted that the main characteristics of adult learners according to his Theory of Andragogy are:

- Experience: Assert that adults use prior knowledge, activities, and encounters as resources for future learning.
- Self-concept: Asserts that adults change from total dependency to self-dependency and self-direction.
- Orientation: Asserts that adults experience personal motivation to learn new information.
- Need to know: Asserts that adults need to understand how the information, skill, or task being learned will benefit them personally.
- Readiness: Asserts that learning occurs when the adult is ready to take on new social roles.

Knowles later (1990) added another assumption to his list of characteristics of adult learners. This assumption was that adults receive their motivation to learn from internal factors.

Readiness for Online Learning

The concept of readiness was critical in the present study. Readiness has been studied in many contexts, including learning, which is the context of interest in this study.

The theoretical framework developed for the study proposes, in fact, that readiness directly affects learning.

Readiness is a complex concept and has been related in the literature to a variety of variables. Over the years a number of factors have been studied and examined to learn about their effect on learner readiness. This researcher observed in reviewing the literature on learner readiness that these factors have ranged from demographics to personal variables to academic variables. Both internal and external factors were also noted as having been cited as influences on readiness. This observation is supported by Bandura's model of human behavior and its suggestion that "… the behavior of an individual both influences and is influenced by personal factors and the environment" (Ormrod, 2011, p. 354).

It might be argued that the influence of these variables on learner readiness may differ in importance depending upon whether a course is offered in a traditional in-class format or online because these formats present quite different environments. Such an argument is supported by Street (2010), who pointed out several implications on readiness of Bandura's behavior model for online:

> A student's decision whether to drop-out or persist in an online environment influences and is influenced by personal factors such as self-efficacy, self-determination, autonomy, and time management. A student's decision whether to drop-out or persist in an online environment also influences and is influenced by environmental factors such as family support, organizational support, and technical support. A third, unique factor can be added for online attrition. Course factors of relevance and design influence a learner's decision to persist or drop an online course. (p. 5)

As this researcher reviewed the literature related to online learning readiness, she observed that there was, indeed, mixed reviews of contributing factors. At times, specific factors were found to be favorable for online learner readiness. Other times the same

factors were found to make no difference whatsoever in readiness and success levels for online classes.

While a wide variety of factors have been identified in the literature as related to online learner readiness, the most current definitions focus on an individual's time management skills and their level of self-directed learning. They also an individual's motivation level, preferred learning style, and past experiences (Smith, et. al., 2003; Smith, 2005). Technical skills also appear to be highly necessary. The actual requirements for these technical skills vary depending upon the course subject and design (Watson, Winograd, & Kalmon, 2004).

The next section of the literature review presents summaries of the wide range of factors that have been studied as related to online learning readiness. The factors have been grouped by the researcher to facilitate comprehension of the range and variety of factors addressed in the literature.

Readiness Factors in Online Learning

In this literature review, the researcher touches on previously studied factors and some of the outcomes of these studies for each factor. For organizational purposes, the researcher has placed the literature factors into one of the four categories from the conceptual framework model introduced in Chapter 1 in Figure 3. The four identified categories of variables from literature include (A) academic skills and abilities, (B) performance, (C) technology skills and access and (D) individual attributes. Academic skills and abilities focuses on two areas; actual skills and abilities related to academics and the indicators of these skills and abilities. Actual skills and abilities would include notions such as time management, assignment completion rate, and study skills. The

indicators of these skills sets are items such as grade point average (GPA), previous college and/or class experience, and communication. Performance focuses on a student's attitude towards school, online classes and the subject matter in these courses. There is an emphasis on self-directed learning, self-efficacy, and motivation in this category. Technology skills and access examines the availability of the technology and the stability of the internet access, a student's level of computer experience, and web self-efficacy. There is a focus on actual technological skills and confidence level surrounding those skill sets. The last category is individual attributes which includes various student demographics, time commitments, and family/friend support. Demographics range from age to gender to race/ethnicity; whereas, time commitments looks at devotion to work and family in regards to time.

It is important to note that there are a few factors that have been placed in multiple categories in research literature. For these factors, the researcher moved the factor to where it was most often found in the research. In addition, where possible, the researcher has looked specifically at studies involving community college students for each factor.

Academic Skills and Abilities

This category could also be referred to as college readiness skills and abilities. It includes academic skills such as assignment completion rate, note taking, test taking skills and time management. This takes into account previous college experience, previous online class experience, learning styles and grade point average (GPA). It also includes self-advocacy and communication. Communications is a big portion of this section looking at interactions whether it is online, via phone or by email.

Communication. This factor includes several different aspects of communication including the soft skills required for communication, the technology skills needed to communicate via platforms such as email or discussion boards, and the response time or frequency of communication. As it is in most endeavors, communication is important to completing an online course. When looked at separately, the studies on this factor showed mixed results depending upon the other student factors encompassed in the sample. In several studies, communication skills were found to be a significant predictor of online learning success (Mykota & Duncan, 2007; Parker, Hogan, Eastabrook, Oke, & Wood, 2006). Other studies focused on specific areas of communication such as discussion boards and emails (Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marcynski, 2011; Smith, Murphy, & Mahoney, 2003). Whereas, Aargon and Johnson (2008) noted that poor communication skills are a barrier to success in online courses, other studies found that communication skills are not necessary for online learning readiness or course success (Dabbagh, 2007). The general conclusion from studies such as these is that the findings have been inconsistent and probably confounded by the other student variables included in specific studies.

Completed Online Classes. This factor deals directly with the number of previously completed online courses. Students who had completed fewer online courses have demonstrated lower academic and technical skills and this deficiency has been found to have a negative impact on success (Moore, Bartkovich, Fetzner, & Sherrill, 2002). Tyler-Smith (2006) also found that first generation adult, part-time students taking online classes not only have to negotiate the learning content of the course but also must cope with several other issues requiring them to: (a) negotiate the technology, (b) negotiate the

course Web site, (c) become an e-learner, and (d) negotiate computer-mediated communication. Unsuccessfully completing an online course has also been found to have a negative impact (Hachey, Wladis, & Conway, 2012; Hixon, Ralston-Berg, Buckenmeyer, & Barczyk, 2016). This relationship could change depending upon the reason why the student was unsuccessful; however, if the lack of success was due to procrastination, lack of computer and internet access, bad study skills, or a lack of motivation, it might be hypothesized these same bad skills will be carried forward to future online classes

Studies have found successful prior online learning experience creates a sense of familiarity and comfort with online course formats which raises a student's success rate (Harrell & Bower, 2011; Mattice & Dixon, 1999; Muse, 2003). This is to say if a student is successful with one online course, their level of self-efficacy and motivation increases and they anticipate success in future online courses (Bandura, 2000). These studies suggest that success in an online course shows that a student was able to navigate the course, communicate with the instructor or other students, and deliver the desired outcomes in a timely manner, at least partly because of increased comfort and self-efficacy with the online environment stemming from prior experience.

Course Design. The design of an online course was conceptualized and presented in a number of ways through various studies of relationship to student success. Course design could refer to the ease of navigation of the course Web site, the clearness of direction, the timeliness of response and grading, the structure of the online course, or the number and types of interaction that take place in the online course. User friendly and/or easy-to-navigate course designs were found to make a difference in online course success

in some of the research (Cantrell, O'Leary, & Ward, 2008; McKavanagh, Kanes, Beven, Cunningham, & Choy, 2002). Flexibility of time in online courses was also noted as a positive design feature in the research on course design (Ivankova & Stick, 2007; Muller, 2008).

Specifically in this category, there have been multiple studies focused on the effects of online interaction on student success (Anderson & Garrison, 1998; Jung, Choi, Lim, & Leem, 2002). Moore (1989) categorized interaction into three dimensions. These include focusing on sender/receiver dynamics involving learner-content, learner-instructor, and receiver dynamics. Increased levels of interactions, whether between instructors or peer, consistently resulted in a higher student satisfaction rate and increased learning outcomes compared to those outcomes for students with lower course interaction rates (Anderson & Garrison, 1998; Eom, Wen & Ashill, 2006; Hong, 2002; Kreijns, Kirschner, & Jochems, 2002; Swan, 2004). The literature thus appears to clearly support presence of interaction as a positive factor in course design for learner success in online courses.

However, interaction was not the only course design factor shown to be related to student online success, and the effects of and need for interaction can be affected by other learner variables. Course design can also be influenced by other factors including previous online course completion, procrastination, academic skills, educational experience and more (Deka & McMurry, 2006; Hachey, Wladis, & Conway, 2012; Romano, Wallace, Helmick, Carey & Adkins, 2005). The more structured and easy to navigate an online course is, the less interaction the students needed to be successful; however, if there was little structure and unclear direction, the frequency and type of interactions needed to be successful increased (Ni, 2013). This literature suggests that the

interaction variable in online course design is probably complex, multivariate, and confounded with other variables.

Developmental Course Placement. Students placing into developmental courses already demonstrate academic weaknesses in various areas. These weaknesses might be from a lack of preparation, procrastination, or actual academic skills. The literature reports mixed results on the relationship between developmental course placement and success in online courses. Aragon and Johnson (2008) showed no significant correlation between placement in a developmental course and success or completion of the online course. There were other studies that showed the opposite results (Fike & Fike, 2008; Liu, Gomez, Khan, & Yen, 2007; Zavarella, 2008). Other researchers have provided additional findings regarding developmental courses and their relationship to academic success. For example, Bailey (2009) found that students who were referred to one or more developmental courses had low retention rates in the developmental courses and that the chances of success decreased as the number of developmental courses required increased. There are also some studies on differences in retention depending on the type of developmental course a student places into such as reading, writing, or math (Bettinger & Long, 2005). For example, Fike and Fike (2008) found that students succeeding in a development English course were more likely to persist in other courses and between semesters.

Financial Aid Status. This factor relates to a student's financial aid eligibility. This eligibility could be tied to a number of underlying reasons. For example, a student's socioeconomic status could relate to greater or lesser familiarity and access to technology and to level of formalized higher education in the past (Lau & Shaikh, 2012). It could

also indicate level of family support for the student. Additionally, financial aid could be viewed as a motivator or as a lack of motivation for the student. Hachey, Wladis, and Conway (2014) and Lau (2008) found a connection with financial aid and lack of success in online courses. Regardless of the reasons behind the financial aid status, Aragon and Johnson (2008) noted that there was no significant association in regard to financial aid eligibility and readiness to take online courses. Overall this factor was not found in the literature to be clearly related to readiness and online course success.

Grade Point Average (GPA). Several levels of GPA have been studied in relationship to learning success at several different academic environment levels. The literature reports studies conducted on the high school GPA, transfer GPA, and college GPA. College GPA was found to be an indicator of success in several studies (Aragon & Johnson, 2008; Menager-Beely, 2001; Valasek, 2001), whether at students' current college or transferred into the college from another location. These studies reported that the higher the GPA was the more likely the student is to succeed in the online course. Several researchers suggested that this success could be attributed to a higher skill set which translates into a better grade or to self-motivation from having successfully completed other courses (Harrell & Bower, 2011; Morris, Finnegan, & Wu, 2005; Muse, 2003). This body of literature suggests that students' GPA might be expected to be associated with their success in online courses, and that this relationship may be positive in direction. Osborn (2001), however, found that GPA alone was not a significant predictor of course success, suggestion that this relationship may be complex and multivariate, with other variables confounding the observed GPA-to-success relationship.

Learning Styles. Learning style – that is, the manner in which learners "… most efficiently and most effectively perceive, process, store and recall what they are attempting to learn" (James & Gardner, 1995, p. 20) – has been shown to have a strong positive relationship with persistence specifically in the community college online environment (Hughes, 2002; Mathes, 2003; Schilke, 2001), which was the environmental context for the present study. The proposed theory behind this relationship the styles is that by understanding one's learning style, individuals will be better equipped to succeed or to spot and correct problem areas in their classes (Devi, 2001). It has also been posited in the literature that students' preferred learning style may affect their success in online courses because of the nature of such courses. For example, those who enjoy the social interactions or auditory lectures of the face-to-face classroom may not fare as well in online learning environments (Ramos, 2001).

There are many different learning styles inventories that have been used in reported literature. One that has been used before in higher education settings is the Barsch Learning Style Inventory (Davis, Nur, & Ruru, 1994; Gatta, 2002; Harrell & Bower, 2011). The Barsch Learning Style Inventory (1996) breaks items down to four basic types of learning styles, which are auditory, kinesthetic, visual and tactile. With this specific instrument, Harrell and Bower (2011) found that a higher score as an auditory learner predicted less success in an online course, thus demonstrating a relationship between a specific learning style and online success. Learning style has also been found to be a predictor of course success in other studies with other inventories such as the Index of Learning Styles (ILS), Kolb Learning Style Inventory, or the Myers-

Briggs Type Indicator (MBTI) (Battalio, 2009; Felder & Soloman, 1999; Ho & Tabata, 2001; Mathes, 2003).

Prior Coursework. This factor takes into account the number of courses previously completed in higher education. These courses may have been completed concurrently during high school or at the student's college/university. Overall, number of course successfully completed was positively associated with online course success. In addition, Gaytan (2015) noted that even credits transferred from another college/university aided in a student's level of persistence in online courses. In each of these settings, persistence was found to be impacted by the number of previously completed college credit hours (Dabbagh, 2007; Deka & McMurry, 2006; Moore, et al., 2002; Moore & Kearsley, 2005; Xu & Jaggers, 2011). Other studies were more specific in stating that completed courses that resulted in good grades lead to higher levels of readiness and success (Bernt & Bugbee, 1993; Coggins, 1988; Dille & Mezack, 1991; Garrison, 1993; Johnstone & Connick, 2005; Li, 2002; Williams, 2003).

Student Enrollment Status. This factor takes into account whether a student is enrolled full time or part time and can be impacted by and confounded with a number of other factors such as family status, level of support, work hours, and prior experience. It has been this researcher's professional experience as a college administrator that as an undergraduate, full time enrollment is typically classified as taking 12 or more credit hours in one semester, while part time enrollment would be anything less than 12 credit hours in a semester. Research literature reports several findings related to student enrollment status and academic success. Several older studies showed that there were more part time students in online classes due to their work load and family commitments

(Halsne and Gatta, 2002; Park, 2007). However, due to the increase in online courses and availability of technology, these results may have changed.

The literature provides mixed results relating to enrollment status and academic persistence and success. Some studies indicated that enrollment status did impact persistence (Muse, 2003). Specifically, it has been reported that students enrolled full-time were less likely to persist than their part-time counterparts (Moore et al, 2002). However, the opposite has also been found as well. For example, Aragon and Johnson (2008) found that students who enrolled in more hours were more likely to be successful in their online courses. In addition, some studies indicated very little difference between the two different levels of enrollment status. For example, Colorado and Eberle (2010) noted only a slightly higher persistence level in full time students. Based on this conflicting evidence in the literature regarding the relationship between student enrollment status and course persistence and success, this relationship appears to be inconclusive and possibly confounded by other learner variables.

Time Management. This factor deals with scheduling and prioritizing time and tasks. It often goes hand-in-hand with procrastination. Research has suggested that institutions as well as learners are positively impacted when students become ready to handle time management, stress management, prioritizing tasks, taking notes in class in online environment and using critical thinking skills (Vonderwell & Savery, 2004). Some studies group this factor in with a general group of academic skills such as note taking and assignment completion, while other studies have recognized time management as an important factor on its own and is often cited as critical for student success in online classes (Bullen, 1998; Berge & Huang, 2004; Levy, 2007; Mandernach, Donnelli, &

Dailey-Hebert, 2006; Selim, 2007). Overall time management is reported to be woven in with and confounded by other factors which cause time constraints such as family and work. These constraints often make online learning an attractive option due to schedule flexibility while simultaneously impacting successful time management (Ivankova & Stick, 2007; Nash, 2005; Stanford-Bowers, 2008).

Student Services Support. This factor includes important academic and administrative services like tutoring, advisement, registration, and library services for online students. These services are not always in place for online students when colleges begin to offer online classes. Students' ability to utilize these important services without visiting the campus during the day during office hours is important in helping students stay on track and moving forward. Successfully accessing and using this support has been found to be positively related to persistence rates in online learning (Bunn, 2004; Fairchild, 2003; Ivankova & Stick, 2007; Pullan, 2011; Simpson, 2003).

Performance

Included in this category is a student's attitude towards school, online classes, and the subject matter. It also looks at achievement in past classes. Locus of control and procrastination habits are also found in this section. The biggest portion of this category is motivation and self-efficacy.

Active Learning/Self-Directed Learning. Online learning requires a student to participate in active learning or self-directed practices. "Active learning is a broadly inclusive term, used to describe several models of instruction that holds learners responsible for their own learning" (Michel, Cater, & Varela, 2009, p. 398). This active learning plays a role in student engagement in online courses (Boote, 1998; Smith, 2010).

Also, active learning is often referred to as self-managed learning. Self-managed learning requires students to move from passive learners to active learners in regards to their education (Alshare, Freeze, Lane, & Wen, 2011). Regardless of whether the concept or skill is called self-managed or active learning, researchers generally agree that being a self-directed learner is a critical success factor in online education (Cennamo & Ross, 2000; Connor, 2004; Warner, Christie, and Choy, 1998; Whipp & Chiarelli, 2004; Zimmerman, 2000). If a student is not an active learner, his/her persistence level in online courses will be lower (Willging & Johnson, 2004). The general agreement of researchers on this principle of clear positive relationship between active/self-directed learning capability and success in online courses appears to be virtually uncontested in the literature.

Education Level. This factor looks directly at a student's previously obtained and/or attempted educational experience. Watson (2005) stated that the educational backgrounds of online learners could provide early warning indicators for failure or success in online education courses. The outcome of failure or success was predicted by the previous educational outcomes.

As with many factors related to online learning success, studies have shown mixed results. Some studies indicate that the higher the education level obtained, the better the odds are for future education (Bunn, 2004; Muse, 2003; Shin & Chan, 2004). In other studies, educational level has not been shown to significantly predict learning outcomes in a distance education in the literature (Yukselturk & Bulut, 2007). This factor could be highly dependent upon the level of education previously obtained and the outcome of this education. For example, students with higher degrees and a good GPA,

may exhibit additional skill sets needed to succeed in other classes versus a student with a limited education. Whereas, students with less experience may have lower success rates (Dupin-Bryant, 2004; Levy, 2007). Overall the nature of the relationship between students' prior education level and their success in online courses appears to be inconclusive, complex, and confounded by related variables.

Locus of Control. Locus of control is a theoretical construct grounded in social learning theory and refers to the belief concerning one's control over life events (Yukselturk, 2009). There are two possible loci in this theory, internal and external. In internal locus of control, individuals believe that with ability and/or effort, they can determine their own success (Rotter, 1966). With internal locus, a student's management skills have been shown as being critical in online success (Levy, 2007). In external locus of control, individuals believe, that outside forces control the outcomes (Rotter, 1966). This theory on locus of control ties directly into being an active or self-directed learner and has been found to impact success in online courses (Golladay, Prybutok, & Huff, 2000; Harrell & Bower, 2011; Yukselturk & Bulut, 2007). It has also been shown to impact a student's persistence in online courses (Parker, 2003). Thus, the literature appears to indicate that locus of control is related to success in online courses, and that an internal locus is more favorable for success that is external control.

Motivation. This factor showed up repeatedly in studies on online learner readiness. In these studies, there was often a positive relationship between motivation and course completion (Artino, 2007; ChanLin, 2009; Ivankova & Stick, 2007; Golladay, Prybutok, & Huff, 2000; Liu & Lin, 2010). According to Pillay, Irving, and Tones, "motivation addresses the ability to concentrate despite distractions and remain motivated

despite lack of immediate student/instructor contact (2007, p. 222). Motivation and active learning go hand-in-hand towards readiness and success (Kemp, 2002; Li, 2002; Sankaran & Tung, 2001). The main portion of self-managed or active learning is motivation (Smith, 2001). Energy in the form of self-motivation moves students towards their goals (Zimmerman, 1984, 1994). High motivation levels in students indicate a higher level of success and learning in online courses than occur in students who exhibit lower levels of motivation (Frankola, 2001; Holder, 2007).

If students have a lower level of motivation, Hongmei (2002) has shown that regardless of their beginning level of motivation, students can create their own motivation needed to reach the end goal of success. This is due to the characteristics of motivated students. Motivated students who are self-directed and have good time management skills have been found to do better in online learning (Hongmei, 2002). However, if students have lower levels of motivation and skill sets like goal setting, self-rewards, and setting consequences, studies have shown they are likely to be less successful in online courses (Dembo & Eaton, 2000). These studies indicate a clear and consistent positive relationship between students' motivation and their success in online learning.

Procrastination. Delaying starting or completing a task has been defined as procrastination (Lay, 1986). Time management skills, self-regulation processes, and social regulation processes can all lead to procrastination. Thus, procrastination habits or students' ability to manage their procrastination can play a role in their academic success or failure. Several studies have attempted to examine the role of procrastination in online class performance (Elvers, Polzella, & Graetz, 2003; Romano, Wallace, Helmick, Carey

& Adkins, 2005; Tuckman, 2002, 2005, 2007). Steel (2007) found that 80% to 95% of students procrastinate; furthermore, Solomon and Rothblum (1984) found that 50% of students procrastinate consistently. Unfortunately, procrastination has been shown to have a negative correlation with learning (Goda, Yamada, Kato, Matsuda, Saito, & Miyagawa, 2015; Michinov, Brunot, Le Bohec, Juhel, & Delaval, 2001; Tan, Ang, Klassen, Yeo, Wong, Huan, & Chong, 2008) meaning the more procrastination a student participates in, the lower his or her success level is in the end. This establishes an anticipated relationship between students' level of procrastination and their success in online courses, particularly given the lack of personal instructor pressure to complete work in a timely manner found in many online courses.

Self-Efficacy. Many researchers have studied the effect of self-efficacy in educational settings. According to Bandura (1986) self-efficacy pertains to "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391). This belief of an individual in their capabilities and skills helps to predict their success in the endeavor (Bandura, 1977; Schunk, 1991; Zimmerman, 2000). According to Bandura (1997), self-efficacy influences "initiation and persistence with a task" (p. 193). This persistence and effort are important for online courses and are positively correlated with self-efficacy (Bouffard-Bouchard, 1990; Lane, Lane, & Kyprianou, 2004; Potosky & Ramakrishna, 2002; Schunk, 1991). When researching success in online courses, Ormrod (2011) discovered three main components affect student retention in online courses including self-efficacy, course relevance, and the level of support. Other studies focus only on self-efficacy and report that the level of determination and effort directly correlate to student success (Holder,

2007; Kemp, 2002; Park & Choi, 2009). Wang and Wu (2008) point out that self-efficacy is also tied to feedback behaviors and a student's learning strategy. These studies appear to support positive relationship between students' self-efficacy and their success in online learning.

Technology Skills and Access

This involves the availability and stability of a student's internet connection. This directly relates to the student's access and availability to the technology itself. Even though technology comes in many forms such as phones, computers and tablets and internet connections can be found in many places like restaurants, stores and libraries, this does not mean that students know how to perform essential online classroom skills. Computer experience and their access to computers can have an impact on online course persistence (Hughes, 2002; Moore et. al., 2002; Moore, 2001; Tyler-Smith, 2006). Technological barriers have been cited by students as the main reason for withdrawal in online courses at community colleges (Schilke, 2001). These barriers could be a lack of access, anxiety around using technology, or a lack of technology skills. This category examines if the student's abilities and their possible barriers. Devi (2001) discovered that students need self-management skills and a level of comfort with technology to be effective in online learning courses. This category encompasses all essential skills required for online learning readiness.

Computer Stability/Access. Although this factor may seem like common sense, there are individuals signing up for online courses who currently do not own a computer or have regular access to the Internet. This lack of technology can cause several problems including lack of adequate experience with the technology and software,

regular or convenient access to the technology, and stable or regular access to the Internet. Without the actual technology, stable internet connection, or a basic familiarity with the software such as Microsoft Office, students would appear intuitively to be facing an uphill battle with an online course. Some studies bore out this logical assumption and found a negative correlation between a lack of technology access and stability and online course success (Harrell & Bower, 2011; Mercado, 2008; Stanford-Bowers, 2008). On the other hand, some studies found no correlation between computer access and student success in online courses (Ibrahim, Silong & Samah, 2002; Schrum & Hong, 2002; Waschull, 2005). The reason for this unexpected inconsistency is unclear and merits further investigation.

Computer Self-Efficacy. Computer self-efficacy refers to student's self-confidence and their ability to perform tasks and apply a set of computer skills (Vuorela & Nummenmaa, 2004a). Learners' experiences in online learning, their level of support from family, friends and faculty, and their feelings about technology are all part of their computer self-efficacy (Pillay, Irving & Tones, 2007). Barbeite and Weiss (2004) found that these feelings and skills can predict if a student will learn well in online courses. This correlation between feelings and skills and online learning success was also found in other studies (Muse, 2003; Pillay, Irving, & Tones, 2007; Rhee, Verma, Plaschka, & Kickul, 2007). Studies such as these appear to establish a clear link between computer self-efficacy and successful learning online. Possession of computer skills seemingly plays a major role in students' computer self-efficacy (Askar & Davenport, 2009; Compeau & Higgins, 1995; Osika & Sharp, 2002). According to these studies, students with low self-esteem around their computer abilities, high anxiety about their computer

skills, or low levels of technical support to build their skills often have negative correlations with online learner readiness and success.

Need for Online Courses. Mattice and Dixon (1999) pointed out that students expect to learn from technology while in school. The technology could be in class or the class could be offered via technology. This category of factors deals with the students' actual need for online classes as opposed to on-ground classes housed within institutions. This coursework need may arise for several different reasons including flexibility of schedule, geographic location, or other life circumstances (Muller, 2008). It might be expected that increased need would be related to increased success in online courses. However, recent research does not support this expectation. It appears instead that the reasons listed above may no longer be the prime reasons students take online classes. Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marcynski (2011) did not find that location, work, or family responsibility were big factors in online learner readiness. This finding and the questions it raises regarding changing reasons for students' choice of online courses and their success in those courses presents an important line of inquiry for technology research.

Web Self-Efficacy. "Learner Web self-efficacy reflects the belief in one's capabilities to execute browser based actions in online learning such as Web search, browsing, up/downloading, and online communication" (Alshare, et. al., 2011, p. 442). Due to the surge of technology and its availability, most students have some experience with either a computer/laptop or a smart phone; however, the ability to Google an item does not necessarily equate with good research practices. Good research skills and the ability to find and distinguish good sources on the Web are very different from simply navigating social media, music or game sites. Students' willingness to exert effort and

engage with technology skills beyond simple social activities and their perception of their own skill levels have been addressed in the research literature as related to online course success. For example, Ranganathan and Jha (2007) found that the amount of effort, the level of persistence, and the willingness to engage in technology all played an essential role in a student's Web self-efficacy. This contention was echoed in several studies. The higher a student's perceived Web skills are, the greater the chance for success and completion in an online course (Isman & Celikli, 2009; Moos & Azevedo, 2009; Salanova, Grau, Cifre, & Llorens, 2000; Tsai & Tsai, 2003). Some studies also linked Web self-efficacy with desire to take online courses as well as the learning performance within those courses (Bandura, 1997; Wang and Newlin, 2002). Studies such as these provide general support for positive relationship between learners' Web self-efficacy or perception of their Internet skills and their success in online courses.

Individual Attributes

This category takes into account time commitments and support/expectations. It also looks at various student demographics. Encompassed within time commitments are the number of hours the student works, their family obligations and their social commitments. The other side looks at the support a student receives from their family, friends and work setting. Student demographics looks at age, gender, and race/ethnicity. Career expectations or family expectations often hint at performance or more specifically motivation.

Age. This factor looks at a student's age and online course success and ties into other factors. The literature reveals no clear age definition or outcome for specific ages such as positive or negative effects on online course persistence. Some research shows that age

does play a role in student success in online courses (Hong, 2002; Yukselturk & Bulut, 2007). That role changes depending on the research. In some studies, younger students are expected to perform better in online classes due to their knowledge of technology and lack of time constraints (Lim, Morris & Yoon, 2006). Other times older students are expected to perform better due to previous experience and motivation (Muse, 2003; Wojciechowski & Palmer, 2005). Additionally, there are studies that indicate that age doesn't affect success (Colorado & Eberle, 2010). Thus, no clear relationship between students' age and their success in online courses emerges from the literature. This relationship may be complex, confounded with other variables, and merits further investigation.

Family and Friend Support. The literature has demonstrated that support by friends and family can be an important factor in a student's online success and readiness. Park and Choi (2009) noted that "adult learners are more likely to drop out of online courses when they do not receive support from their family and/or organization while taking online courses, regardless of a learner's academic preparation and aspiration (p. 215)." Even a perceived lack of support has been shown to make students less successful in online courses (Bunn, 2004). In opposition to this, studies have demonstrated that when students feel supported and encouraged, their level of persistence increases in online courses (Holder, 2007; Ivankova & Stick, 2007; Kemp, 2002; Muller, 2008). Thus, the literature appears to support a positive relationship between support of family, friends, and colleagues and success in online courses. Apparently, this perceived level of support paired with other life circumstances such as family status, relationship status, and work status can all affect a student's level of online readiness and success.

Family Status. Family status takes into consideration a student's family obligations and responsibilities. Some of these obligations could be an ailing parent, needs of a spouse or responsibilities to children. Family status also changes when an individual is married and working as a team or is single and has family to support while handling all family matters on his/her own. Given familial responsibilities, the flexibility of online courses is often appealing to students with families (Muller, 2008). Relating to this issue, Moore and colleagues (2002) found that students have a hard time balancing family commitments and work schedules with their academic obligations. This juggling of time and schedules has been cited as the reason behind course withdrawal and could be related to success in online classes (Colorado & Eberle, 2010). Ivankova and Stick (2007) found that students' success in online courses was subject to their time management skills and their focus which is often not on their education. If students are successful in their time management and directed in their focus, their level of persistence raises dramatically (Bunn, 2004). When this literature is integrated, it appears that family status and responsibilities are often in conflict with the requirements of education. This may make the apparent flexibility of online courses appealing to busy students, but if they lack the time management skills and the focus required for learning online, students may find that online courses are not appropriate for them and may encounter failure.

Gender. Many studies have examined whether or not gender plays a role in online learner readiness and successful completion of online courses. Studies on gender with online community college students specifically have been inconsistent and have yielded varied results (Harrell & Bower, 2011). The role of gender in online learning is important, given that female participation has increased in higher education and currently

there are more female students than male students in both online and traditional classroom formats (Dell, Low, & Wilker, 2010). This could be related to a number of other factors such as family status, work hours, and relationship status (Mueller, 2008), which can be different for males and females. Some research has shown that the two genders performed differently in online environments (Muse, 2003; Yukselturk & Bulut, 2007). Some studies have favored females in success in online courses. For example, Dabaj (2009) showed that females had better attitudes towards online learning and that this attitude played a part in their performance; similarly, Nistor and Neubauer (2010) concluded that female students exceled in online communication environments, performing better in the online course they studied. Some studies have reported that while men's initial attraction to taking an online course was higher, males didn't perform as well and tended to drop out in the later stages (Mattice & Dixon, 1999; Sullivan, 2001). These studies raise the question of whether the success rate in an online course was due to gender or more to the motivation and communication factors that a specific group of females possessed. Liu and Chang (2010) reported no significant differences between the two sexes in specific areas of online courses. On balance, the literature on gender and online learning success is equivocal and may be confounded by complex relationships of gender with other variables.

Race/Ethnicity. Multiple studies have investigated ethnicity as an important variable in the experiences and success of community college online students (Moore, 2001; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Sullivan 2011). Findings have been inconsistent. In one study, minority students – especially African American students – were found to be less successful in their online courses than white students (Moore, 2001;

Moore et. al., 2002). This could be due to a number of reasons including less availability of technology, less support from family and friends, difficulties inherent in being first generation college students, and work status. Angiello (2002) noted a lower level of satisfaction with online classes in Hispanic populations and demonstrated that lower level of satisfaction caused lower levels of persistence. Other studies were more generalized regarding race/ethnicity and online learning, pointing out that race had significant effects on learning satisfaction (Lu, Yu, & Liu, 2003; Muilenburg & Berge, 2005) or reporting that that race had no effect on student success in online courses (Willging & Johnson, 2004; Ke & Kwak, 2013). Studies such as these point to inconsistencies in findings relating to race/ethnicity and online learning.

Relationship Status. This factor examines the status of an individual's personal relationships. A variety of studies have been conducted on these relationships to see how their status effects students' online course success and readiness. This includes studies on married students, students in the middle of a divorce, single students, and widowed students. Due to the nature of this factor, it is frequently intermingled and confounded with a number of other factors. Possibly for this reason, relationship studies have shown mixed results. Halsne and Gatta (2002) found that a 'married' relationship status could be important to success if the spouse was supportive of the student's learning goals. In contrast, married students could also be less successful when the relationship indicated that the students had other time commitments (Liu, Gomez, & Yen, 2009). Alternatively, Muse (2003) showed that relationship status was not a significant predicator of online learner readiness. On balance, the literature indicates that the relationship between

learners' marital relationship status and their readiness and success in online courses is not clearly established and may be confounded by other social and personal variables.

Work Status. Work and its relationship to learning has been looked at from two different angles in the literature. One angle would be the time constraints of working a full time job and the problems that may arise from conflicting schedules (Ibrahim, Silong, & Samah, 2002). The other angle focuses on the actual employment status of an individual. In 1988 Brey's study of community college students included the data showing 80% of online students were employed. Studies have also showed that 60% of online students were also women (Huang, 2002). Muse (2003) showed that even though many women worked, this factor was not a significant predictor of student success in online learning.

Students' different work statuses could have different results on readiness and student success, according to the literature. Too many work hours coupled with not enough support or too many other obligations may cause students' learning success to suffer (Conklin, 1991; Ivankova & Stick, 2007; Kemp, 2002). On the other side, students working full time might be better at time management and demonstrate an increase in motivation to be successful (Bunn, 2004). Overall the effects of this factor on student online learning has had mixed results in studies.

ToOLS Instrument

To avoid attrition in online learning, several assessments have been developed to assist students in understanding what skills are required for self-directed, online learning (Smith, 2005). One of these assessments is the *Test of Online Learning Success* (ToOLS) instrument (Kerr, et. al., 2006). This was the assessment measure chosen for analysis in

the present study. ToOLS comprises a total of 45 items, grouped into five categories used to assess readiness factors for online learning. The five ToOLS item categories include computer skills, independent learning, dependent learning, need for online learning, and academic skills. All 45 ToOLS items are presented as Likert-type scale questions, all based on 6-point scales. The five item categories are briefly explained below.

Computer Skills

This section of ToOLS (Kerr, et. al., 2006) includes questions on using the computer and various types of software. The items came mainly from the Internet Self-efficacy Scale or ISES (Eastin & LaRose, 2000). Some of the areas covered are e-mail abilities, word processing software experience, discussion board capabilities and Internet browser experience. This section includes questions worded positively such as I can, I am capable, or I am competent. These questions and their wording, cover factors on computer self-efficacy and web self-efficacy, such as I am capable of sending and receiving e-mail (Kerr, et. al., 2006).

Independent and Dependent Learning Skills

These two ToOLS (Kerr, et. al., 2006) sections are linked together. Although questions are separated on the instrument, they represent two sides of the same factor, which addresses a student's ability to engage in independent learning rather than reliance on learning that depends on other participants. For example, in the independent learning skills side there is a question addressing the student's self-motivation. In the dependent learning skills side, there is a question on whether a student needs incentives/rewards to motivate him/her to complete a task. Both questions speak to a student's motivation.

Kerr, Rynearson, and Kerr (2006) stated that "Independent learning consists of items that assess one's ability to manage time, balance multiple tasks, set goals, and one's disposition regarding self-discipline, self-motivation, and personal responsibility" (p. 101). The independent learning skills section of ToOLS focuses on these factors and also asks about a student's critical thinking skills. However, the section does contain one question on the student's identification as a procrastinator. It's important to note that this question is reversed scored. Otherwise the questions deal with capabilities and positive skill sets necessary to succeed in online courses (Kerr, et. al., 2006).

In the Dependent Learning Skills section, all of the questions are reverse scored. They ask about a student's procrastination, reading and comprehension ability, lack of time management, and the need for help when it comes to instructions and being reminded of due dates (Kerr, et. al., 2006).

Need for Online Learning

This section of ToOLS (Kerr, et. al., 2006) is somewhat different from other assessments and other sections of ToOLS. This part is based on *the need for online learning* rather than the skills needed for online learning. Focusing on personal issues, it covers information on work schedule, family life, and geographical location. This section is more focused on the reason why students have chosen to take online courses, rather than the actual skills required to be successful. Some of these reasons are thought to play into how successful a student is in an online course.

Academic Skills

The ToOLS (Kerr, et. al., 2006) instrument also has a portion covering *academic skills*. These skills range from questions on communication, learning styles, reading

comprehension, self-efficacy, and active or self-directed learning. There are two reverse scored questions in this section which inquire about a student's learning style and the need for feedback from faculty.

Background and Development of ToOLS

ToOLS (Kerr, et. al., 2006) was developed and validated by several academic from Texas who present credentials and experience appropriate for creating an instrument for assessing readiness for online learning. Dr. Marcel S. Kerr is the current Dean of the School of Natural and Social Sciences at Texas Wesleyan University. She is also a professor of psychology for the university. Holding both a Masters and a PhD in Experimental Psychology, Dr. Kerr is actively involved in her field and with the Institution Research Board at Texas Wesleyan University. She also has a Masters of Education from University of Texas in Educational Technology and publications on the topic of online learning and development (Academics, 2012). Marcus Kerr, also works at Texas Wesleyan University where he holds the position of Chief Information Officer. Marcus Kerr also has a Masters of Education from the University of Texas and was the former director of the Center for Excellence in Teaching and Learning (Kerr Talks Campus Technology, 2012). Dr. Kimberly Rynearson has a PhD in Cognitive Psychology and a Masters in Experimental Psychology from Texas Tech University. She also holds a Masters of Education in Adult Education and Distance Learning. Currently, she is an Associate Professor of Psychology at Tarleton State University in Texas and the Director of Waco Outreach Programs. Her body of research focuses on methods for effective online instruction and on identifying characteristics of successful online learners (Department of Psychology and Counseling, 2010). This includes developing over eight

online courses in Psychology. During her career, she has published over ten articles dealing with online learning including blended classrooms, virtual labs, teaching online, and characteristics for success. She has presented this information at conferences over 15 times (Member Directory, 2014). Based on this information, the ToOLS developers appeared to the researcher to have appropriate credentials and backgrounds in instruction, psychology, online learning, and technology to lend face credibility to the ToOLS instrument.

The original creation and validation of the ToOLS (Kerr, et. al., 2006) instrument was done through extensive research in three sections. The original development and psychometric study of the instrument was conducted in three stages which include development of the survey, determining the structure and reliability of the survey, and assessing the usefulness of the survey. The study was conducted using combined populations representing students from two different four- year universities in Texas. Since its establishment, the ToOLS instrument has been available to the public and for use at other institutions. The three stages of the ToOLS establishment research are summarized below.

Study 1 Study I identified college or universities with online course offerings and required students to complete an online readiness assessment before starting the course. From these findings, the researchers developed the initial version of ToOLS instrument (Kerr, et. al., 2006), and assessed the structure and construct validity of the initial measure. To address these goals, in 2002 the researchers sampled 50 different institutions to see if they met inclusion criteria, i.e., offered online classes and had a set student readiness assessment. These institutions included public and private, two-year

and four-year, and traditional and online only institutions. Thirty of the 50 institutions met both of the above criteria. The assessments were then compared to find common items. This comparison resulted in 428 items. From this pool, 50 of the most frequently reoccurring items were chosen for the initial version of ToOLS. These 50 items were turned into behavioral statements and were arranged into six categories. The categories included computer skills, time management, motivation, academic skills, the need for online delivery, and learning skills as supported by the literature (Kerr, et. al, 2006).

The initial version of ToOLS (Kerr, et. al., 2006) was tested on a 188 students in the fall of 2002. The student pool consisted of a combination of graduate and undergraduate students at a public, four-year university in Central Texas (Kerr, et. al, 2006). In addition to ToOLS, students also completed the Rosenberg Self-Esteem Scale, the Index of Learning Styles, the Metacognitive Reading Strategies Questionnaire, the Academic Intrinsic Motivation Questionnaire, and the Trice Academic Locus of Control Scale. Table 1 shows the topic and structure of these instruments. They were used to cover and test for other variables needed for online learner readiness.

Table 1

Instruments Used in Initial Development Study of ToOLS

Instrument	Year & Developer(s)	Measures	Information on Instrument
Test of Online Learning Success (OLS)	2002 Kerr, Rynearson, & Kerr	Online Learning Success	50-item self-report using a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree" yielding a sum score denoting total online learning success with higher scores reflecting more success
Rosenberg Self-Esteem Scale	1965 Rosenberg	Global Self-Esteem	10-item self-report using a 4 point Likert scale ranging from (A) "strongly agree" to

			(D) “strongly disagree” yielding a score denoting self-esteem with higher scores reflecting higher self-esteem
Index of Learning Styles	1999 Soloman and Felder	Learning Styles	44-item self-report measure of learning styles by selecting statement “a” or statement “b” providing a learning style profile
Metacognitive Reading Strategies Questionnaire (MRSQ)	2004 Taraban, Kerr & Rynearson	Reading Comprehension Strategy Use	31-item self-report using a five-point Likert scale ranging from (1) “never use” to (5) “always use” yielding a total reading strategy score and two subscale scores: analytic cognitions and pragmatic behaviors
Academic Intrinsic Motivation Questionnaire (AIM)	1998 Shia	Intrinsic Motivation	60-item self-report using a seven-point Likert scale ranging from (1) “does not describe me” to a rating of (7) “strongly describes me” providing a total intrinsic motivation score
Trice Academic Locus of Control Scale (ALOC)	1985 Trice	Locus of Control	28-item self-report using “true” or “false” to rate statements about their believed degree of control yielding a score indicating the degree to which they control their fate with lower scores indicating internal locus of control and higher scores indicating an external locus of control

Results of the developmental work were compiled and factor analysis was used to determine the structure of the initial version of ToOLS (Kerr, et. al., 2006). Thirteen factors originally emerged in this analysis based on Eigen values. However, a change in the slope of the scree plot was noted around the fifth factor. This prompted the researchers to try a five-factor solution to the factor analysis and subsequently to create five subscales based on this analysis consisting of 50 items. Based on the individual items that loaded on the five subscales, the subscales were identified as Computer Skills,

Independent Learning, Need for Online Learning, Academic Skills and Dependent Learning (Kerr, et. al, 2006).

Study II The next phase examined the structure, internal consistency, and the validity of the proposed ToOLS instrument (Kerr, et. al., 2006). The initial scoring procedures for the instrument were also developed in this phase. In spring of 2003, the researchers tested ToOLS with 92 students from a public, four-year university in central Texas. The students completed the revised ToOLS survey, the Internet Self-Efficacy Scale, and the Metacognitive Reading Strategies Questionnaire as shown below in Table 2. A factor analysis was again conducted, and the results yielded a five-factor solution similar to those in Study 1, supporting this structure for the instrument. Cronbach's alpha coefficients ranged from .63 to .84 and were used to demonstrate the high internal consistency reliability of ToOLS. The alpha scores for each section of the ToOLS instrument are as follows: Computer Skills .84, Independent Learning .83, Dependent Learning .70, Need for Online Learning .63 and Academic Skills .86. Both the criterion validity and the predictive validity were computed and examined and both were acceptable. Based on these results, ToOLS was accepted as valid and internally reliable and scoring procedures were developed for the instrument (Kerr, et al., 2006).

Table 2
Instruments Used in Study II Development of ToOLS

Instrument	Year & Developer(s)	Measures	Information on Instrument
Test of Online Learning Success (ToOLS)	2003 Kerr, Rynearson, & Kerr	Online Learning Success	50-item self-report using a five-point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree" yielding a sum score denoting total online learning success with higher scores reflecting more success
Metacognitive Reading Strategies Questionnaire (MRSQ)	2004 Taraban, Kerr & Rynearson	Reading Comprehension Strategy Use	31-item self-report using a five-point Likert scale ranging from (1) "never use" to (5) "always use" yielding a total reading strategy score and two subscale scores: analytic cognitions and pragmatic behaviors
Internet Self-efficacy Scale (ISES)	2000 Eastin & LaRose	Internet Self-Efficacy	Eight-item self-report using a seven-point Likert scale ranging from (7) "strongly agree" to (1) "strongly disagree" yielding a one sum score across the eight items

Study III. This portion focused on measurement abilities and reliability of the ToOLS instrument (Kerr, et al, 2006). Student cutoff profiles were also implement in this phase. In the fall of 2003, 140 graduate students from a public university in Texas were given a pretest and a posttest. Both tests consisted of ToOLs, the Scale of Technology and Understanding, and the Computer Self-Efficacy Scale. The original pretest was taken during the second week of class. The posttest was completed during week 15 of the online course. Grades were collected at the end of the class. Out of the 140 participants, 76 students completed the course and both the pretest and posttest.

For data analysis, the pretest was subtracted from the posttest to yield achievement gain scores. Paired sample t-tests were then used to determine if there was significant gains in ToOLS (Kerr, et. al., 2006) scores during the course. The test results

showed significant gains in many categories. Gains were not found to be significant in Independent Learning, Dependent Learning and Attitude Towards Technology Use. Pearson correlation coefficients were used to compare the test-retest reliability. The results showed that ToOLS was adequate but not strong in this area (r 76 = .77). The researchers cited treatment effect due to the instruction received between the two tests as the probable reason for this test-retest result, i.e., measured online readiness may be affected by exposure to online training and learning, thus lowering test-retest reliability, especially a long term.

Hung, Chou, Chen and Own (2010) asserted that comprehensive measures of student readiness need to be designed to assist students in becoming more successful and having a more meaningful online learning experience. Other online learning advocates have agreed, maintaining that these measures would help with student retention in online courses. Unfortunately this appears to be easier said than done in practice. Many of the factors are dependent upon one another and interwoven to various degrees, as suggested by the review of online readiness factors presented in this chapter. ToOLS (Kerr, et. al., 2006) is one instrument that has attempted to assess and classify some of the factors relevant to online learning success. An analysis of the properties of ToOLS and its relationship to student learning outcomes in online courses was the focus of the present study.

Summary

This chapter has presented a review of literature related to the theoretical foundations of the present study, factors related to student readiness for online learning, and the ToOLS (Kerr, et. al., 2006) instrument designed to assess these factors. As stated

above, the literature indicates that online readiness factors are complex and often interrelated. Additionally, these factors may differ depending upon the student population and the geographic location and may be confounded by socioeconomic and sociological forces such as race and gender. After finishing an all-encompassing literature review on retention in online courses, Gaytan (2013) confirmed that:

> … no single set of factors exist that is able to predict student attrition in online courses. However, several common themes emerged from this literature review including external factors (e.g., course factors and support services); personal factors (e.g., self-efficacy and autonomy) and academic factors (e.g., study and time management). (p. 147)

Despite the difficulties of identifying, classifying, and unraveling the multitude of factors that can influence student persistence and success in online learning, ToOLS (Kerr, et. al., 2006) instrument is a readily-available instrument for attempting this difficult task. This study represented an examination of ToOLS through its psychometric properties and relationship to student grades in online courses.

The remaining chapters of this dissertation present the outcomes of this examination of ToOLS (Kerr, et. al., 2006). Chapter IV presents findings that address the study's research questions. Chapter V presents conclusions, implications, and recommendations.

CHAPTER III

METHODOLOGY

Research Design

This was a quantitative study with an *ex post facto* descriptive design, which is defined as *after-the-fact* research in which data reflects a current situation, subjects cannot be randomly assigned, and independent variables are not manipulated by the researcher (Sheskin, 2007). This category of research design uses investigation which starts after the fact has occurred without interference from the researcher. The majority of social research, in contexts in which it is not possible or acceptable to manipulate the characteristics of human participants, is based on *ex post facto* research designs (Salkind, 2010). This study fit the *ex post facto* design, being simply descriptive in nature and based on non-experimental procedures. The study described the demographics of online students at Tulsa Community College, relationships of demographic variables to scores on the ToOLS (Kerr, et. al., 2006) instrument of readiness for online learning, the validity and reliability of the ToOLS instrument, and its usefulness as an indicator of students' success in online learning at the College.

Research Questions and Hypotheses

This study was guided by the following general research questions:

1. To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have content validity?
2. To what extent is ToOLS a reliable instrument for measuring online learner readiness?
3. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?
4. To what extent do ToOLS scores relate to demographic variables of students in online classes?

To accommodate statistical testing, specific research questions and hypotheses were developed to accompany the general questions where appropriate. Appendix 1 presents the specific questions and hypotheses that were addressed statistically in the study.

Research Setting

This study was conducted at Tulsa Community College, a large, urban, multi-campus community college, located in a Midwestern state. The college has four fully equipped campuses and several community campuses spread throughout the urban area. Each campus offers a wide range of undergraduate classes and each one hosts specialized programs such as veterinary technology, child development, biotechnology, journalism and the graphic arts, and aviation. This multi-campus community college serves over 35,000 students in credit and continuing education classes each year and is consistently ranked in the top 35 community colleges of the nation's community college associate degree producers. The college offers over 220 associate degrees and certificate programs. A thriving honors program, service learning, opportunities to study abroad and

a vibrant student life rounds out the college's offerings. The average student age is approximately 27 years old and 33 percent of students are enrolled full time in 12 or more credit hours.

As of the spring semester of 2016, the college currently offers over 20 degrees entirely online. There are a variety of other online courses that may require an on campus orientation or proctored exams throughout the semester. To help online students thrive, the college sends out welcome letters to all first time online students with resources to help them succeed. Some of these resources include online advisement, online tutoring, an online bookstore, and online library services. In addition, the college offers up an online orientation. Part of the orientation consists of basic Blackboard (the college's learning management system) functions and technology practices. The other section of the orientation takes students through an assessment utilizing the ToOLS (Kerr, et. al., 2006) instrument. The end results from ToOLS is used to let a student know how ready they are to take an online class. Currently neither part of the orientation is required. The college is planning on implementing a mandatory online orientation in the future. This study will be utilized to see how well the ToOLS instrument predicts student success in online learning.

The study was implemented using the online student population at Tulsa Community College. This population included 6,983 enrollments in online classes during the spring 2015 semester (Planning and Institutional Research, 2015). The online enrollments represented a broad range of courses including subjects in Science, Math, History, English, Communications, and Engineering & Language Arts.

Methodology

General Methodology

The general methodology for the study was survey research. Survey research is defined as an inquiry which includes data collection and analysis via survey (Creswell, 2013). Specifically, online survey technique was used to facilitate efficient distribution of the study's instrument and rapid data collection and return to the researcher. The research survey contains 45, 6-point Likert-type questions with the point scale ranging from not applicable (0) to strongly disagree (1) to strongly agree (5). The 45 questions fell into five, distinct topics. These topics are computer skills, independent learning, dependent learning, need for online learning, and academic skills. There was also a portion of the survey used to collect demographic information on the student population in online classes at Tulsa Community College. Demographic information collected included race, age, gender, relationship status, and the number of hours per a week the student was currently working. The demographic portion also included questions pertaining to students' level of education such as if they were currently a full or part time student, the number of online courses previously completed, and if they were placed in or had taken developmental courses during their college career. Details of the study's survey questionnaire are presented below in the section on instrumentation.

The study's survey was distributed and all data was collected online via Qualtrics survey software. This software was provided by Oklahoma State University, which hosted the survey site for the researcher. The IRB was approved by both Tulsa Community College (Appendix 1) and Oklahoma State University (Appendix 2).

Population and Sample

As defined by Ravid (2011) "a research population is defined as an entire group of persons or elements that have at least one characteristic in common used for research purposes" (p. 24). The population of interest in this study was students taking online courses in the community college environment. The available population for this study was students taking online courses in a specific large urban multi-campus community college in the Midwestern United States, Tulsa Community College. This population was chosen as a purposive sampling of the larger population of interest due to the researcher's current position as the Academic Division Administrator of Science and Mathematics Tulsa Community College and the researcher's interests and participation in the Distance Learning Council.

Specifically, participants for this study were students attending Tulsa Community College and taking online courses in the Spring Semester of 2015. During the spring of 2015 there were 6,983 enrollments at the college in online classes (Planning and Institutional Research, 2015). This number was reflective of the enrollments on the first day of class in the spring semester and included students who completed the course, withdrew during the semester or were administratively withdrawn. The survey was sent out to 6,983 students which constituted the available population for the study. The group receiving the surveys did not include students enrolled only in courses starting the first eight weeks of the semester due to the timing of the approval of the IRB. Online students in this group may have been enrolled in more than one online class, but they were only allowed to complete the survey one time. All students completing the survey were at least 18 years of age. This was determined early in the survey by a question asking for

the participant's age. If students responded with an age of less than 18 years old, the survey immediately terminated, thanking the student for their time and effort.

A research sample is defined as a small group of observations selected from the total population for the purpose of making inferences about the population. "A sample should be representative of the population because information gained from the sample is used to estimate and predict the population characteristics that are of interest" (Ravid, 2011, p. 24). For this study, he survey sample was completely voluntary and no incentives were offered for participation. The obtained sample was all students who voluntarily completed and submitted the research survey online and was comprised of individuals who completed and returned the online survey instrument. The sample size was $N = 327$; that is, 327 students returned the survey but not all participants answered all questions. Table 3 shows the demographic make-up of the sample, the obtained sample size for each variable, the population size for online students for each variable, and the population size for all students for each variable.

Table 3
Demographics for Sample, Online Population, and Total Student Population in Participating Community College

	Survey Responses		Online Students		All Students	
Gender	*n=157*		*n=6983*		*n=17,199*	
Male	33	21.02%	2491	35.67%	6924	40.26%
Female	122	77.71%	4492	64.33%	10275	59.74%
No Response	2	1.27%	0	0.00%	0	0.00%
Enrollment Status	*n=156*		*n=6983*		*n=17199*	
Full Time	66	42.31%	2311	33.09%	4972	28.91%
Part Time	90	57.69%	4672	66.91%	12227	71.09%
Race	*n=156*		*n=6983*		*n=17199*	
American Indian or Alaskan Native	16	10.26%	614	8.79%	1311	7.62%
Asian	3	1.92%	180	2.58%	668	3.88%
Black or African American	8	5.13%	562	8.05%	1526	8.87%
Hispanic/Latino	9	5.77%	371	5.31%	1248	7.26%
Native Hawaiian/Pacific Islander	1	0.6%	7	0.10%	21	0.12%
White	113	72.44%	4303	61.62%	10123	58.86%
Two or More Races	6	3.85%	631	9.04%	1398	8.13%
Non-Resident Alien	0	0.00%	79	1.13%	310	1.80%
Race/Ethnicity Unknown	0	0.00%	236	3.38%	594	3.45%
Age	*n=157*		*n=6983*		*n=17,199*	
Under 18	0	0.00%	57	0.82%	287	1.67%
18-19	17	10.83%	1033	14.79%	2984	17.35%
20-21	14	8.92%	1374	19.68%	3548	20.63%
22-24	16	10.19%	1101	15.77%	2708	15.75%
25-29	34	21.66%	1249	17.89%	2726	15.85%
30-34	25	15.92%	796	11.40%	1714	9.97%
35-39	13	8.28%	543	7.78%	1149	6.68%
40-49	19	12.10%	548	7.85%	1264	7.35%
50-64	18	11.46%	271	3.88%	700	4.07%
65 and Over	0	0.00%	11	0.16%	119	0.69%
No Response	1	0.64%	0	0.00%	0	0.00%

Several additional demographic questions were added to the questionnaire to permit further description of the sample. These included a student's relationship status, if they tested into developmental courses, past history of online courses, and the number of hours they worked each week. Table 4 below displays the response results from the survey.

As shown in Table 4, almost half, 47% (*n* = 74), of the respondents were single at the time of the study. The next biggest grouping was married students at 34% (*n* = 53). There was a small percentage around 18% (*n* = 29) of students who self- identified as divorced or widowed.

Students were also asked for the number of hours they were working each week. Over half of respondents worked less than ten hours each week. Twenty-one percent of students worked between eleven and twenty hours a week. Only eleven percent worked 31 to 40 hours weekly. No one in this survey reported working over forty hours a week.

Table 4
Relationship Status, Work Pattern, Development Course Status, and Online Course History for Sample

Demographic Questions	**Survey Responses**	**Percentages**
Relationship Status	*n=156*	
Married	*53*	34%
Single	*74*	47%
Divorced	*27*	17%
Widowed	*2*	1%
Weekly Work Hours	*n=156*	
Currently Don't Work	40	26%
0 - 10 Hours	43	28%
11 - 20 Hours	33	21%
21 - 30 Hours	23	15%
31 - 40 Hours	17	11%
Over 40 Hours	0	0%

Tested into Developmental Course(s)	*n=156*	
Yes	57	37%
No	99	63%
Online Courses Completed	*n=155*	
None	63	40%
1 - 2 Online Classes	71	46%
3 - 5 Online Classes	21	13%
6 - 8 Online Classes	0	0%
More than 8 Online Classes	0	0%

The last two demographic questions on the survey pertained to the number of online courses a student had completed and whether the student had tested into a developmental course at Tulsa Community College. Forty percent of students had not taken an online course before the Spring 2015 semester. Forty-six percent of students had completed only one to two online courses previously. None of the students surveyed reported taking over five online classes before the Spring 2015 semester. In addition, 63% of students had not been placed into any developmental courses at the community college, while 37 percent of respondents did place into a developmental course upon entering the college. It should be noted that at this college, developmental courses are offered online as well as in a traditional classroom format.

In summary the obtained sample for this study was predominantly female (78%) and white (72%). The largest age groupings was between the ages of 25 – 34 years old and close to half (47%) of students identified as single. Over half (57%) of the students surveyed were enrolled part time and worked 10 hours or less (54%) each week. Overwhelmingly students in the survey had completed less than two online classes (86%) and did not test into a developmental course (63%).

In comparison with the overall college population including both online and traditional class formats, the survey population did show a few differences. The survey collected information using the same groups as used at Tulsa Community College in the gender category, the enrollment status category, the race/ethnicity category and in the age category. In gender, the survey population was highly female (78%) compared to the full online population (64%) or the total population (60%). Race/ethnicity in the sample also showed some differences from the population. The survey population had a high number of students identifying as white (72%) compared to the general online population (62%) or the total college student population (59%). There was also a slight over-representation of American Indian/Alaskan Native students in the survey results (10%) compared to the population. There was an under-representation in both the Black/African American and the 2 or more Races categories compared to the full online population and the total population. In regards to the age category, overall there were fewer students under the age of 24 (30%) in the survey results; whereas, compared to the online population (50%) and the total population (54%). This pattern differed in two of the higher age groupings. In 25 – 34 age groupings, the survey (37%) resulted in more students than in the full online (29%) or the total population (26%). This is also true of the 40 -64 age groups with the survey (24%) resulting in more students than the full online (12%) or the total population (11%). Enrollment status was the final shared category. The sample included a larger full time student population (42%) than the full online population (33%) and the total population (28%). Overall there were some differences between the sample population, the online population, and the total college population. In summary, the

sample was semi representative of the overall online population at Tulsa Community College.

Instrumentation

Two instruments were used to collect the data for this study. The first instrument was the *Test of Online Learning Success* (ToOLS) (Kerr, et. al., 2006). The other instrument was a demographic questionnaire developed by the researcher. These two instruments were administered together via online survey using Qualtrics software.

ToOLS: Test of Online Learning Success (Kerr, et. al., 2006)**.** As indicated in the name of the instrument, this assessment was developed to measure readiness factors specifically in online learning. It is self-reporting and was designed to administer at the beginning of online courses or before enrolling in online courses to determine the appropriateness of online classes for students. Delivered in a survey format, this test covers five categories. The first category is *computer skills*. This section includes questions on using the computer and various types of software. Some of the areas covered are e-mail abilities, word processing software experience, discussion board capabilities and internet browser experience. Next there are sections on both *independent and dependent learning* which ask questions on learners' motivation, goals and time management. There is also a section covering *academic skills*. The last section is somewhat different from other assessments. This part is based on *the need for online learning* rather than the skills needed for online learning. Focusing on personal issues, it covers information on work schedule, family life, and geographical location. These five categories are covered over the course of 45 Likert-type scale questions, all based on 6-

point scales. The scale ranges from Not Applicable (0) to Neither Agree or Disagree (3) to Strongly Agree (5).

ToOLS Face Validity. As a first step in assessing the suitability of ToOLS (Kerr, et. al., 2006) for this study prior to a more intensive examination, the researcher evaluated its face validity. Face validity refers to the extent to which an instrument appears to measure what it is intended to measure (Ravid, 2011). The face validity for ToOLS stems from two sources: apparent relationship of its questions to readiness for online learning, and the experience and credentials of its authors.

A surface examination of the questions listed in ToOLS (Kerr, et. al., 2006) presents a case for face validity. Each of the five sections of the test (computer skills, independent learning, dependent learning, academic skills, and need for online learning) and the individual questions in each section appear to present intuitive and *prima facie* relationships to readiness for online learning. In addition, the questions appear to cover concepts addressed in the research literature on online readiness. This relationship of ToOLS to known factors for online readiness is addressed more systematically in this study in an analysis of the content validity of the instrument through in-depth examination of its coverage of issues addressed in the research literature.

The appropriateness of the credentials of its authors also support the face validity of ToOLS (Kerr, et. al., 2006). The ToOLS assessment was created by three individuals located in Texas: Dr. Marcel S. Kerr, Marcus C. Kerr, and Dr. Kimberly Rynearson (ToOLS, 2014). To examine the face credibility of the instrument's developers before considering using it in this study, the researcher checked their backgrounds and qualifications to assess their apparent qualifications to develop and validate an instrument

for measuring online learning readiness. The results of this credentials check are reported in Chapter II, along with other details about the development of ToOLS. These results indicated that the ToOLS developers were suitably qualitied to create and validate an instrument to assess readiness for online learning, presenting credentials in both psychology and online learning (see Chapter II for details).

After examining the perceived content of ToOLS (Kerr, et. al., 2006) and the suitability of its creators, the researcher felt the instrument had sufficient face validity to merit further examination of its established format, background, validity, reliability, and factor structure. This examination was necessary before deciding to use ToOLS in this study. Relevant information is presented below.

ToOLS Format. ToOLS (Kerr, et. al., 2006) comprises 45 fixed-response questions divided into five sections. The questions are Likert-like in format, and the response choices range from not applicable (0) to strongly disagree (1) to strongly agree (5). The 45 questions are spread over the five sections of the test as follows: Computer skills = 11 questions; Independent learning = 10 questions; Dependent learning = 6 questions; Academic skills = 13 questions; Need for online learning = 5 questions. The complete ToOLS instrument can be found in Appendix 3.

The ToOLS (Kerr, et. al., 2006) instrument is currently available in both an online and a paper format. In the online format, the assessment scores itself and delivers results to the students immediately upon completion. The paper format must be scored by hand. Some of the questions are reverse scored for consistency of interpretation. Both formats are free to use and do not require permission from the authors for data collection purposes; however, the authors would like to receive a brief description of how the tool is

being used, acknowledgement in publications or presentations, and a summary of the findings. The researcher did contact the authors about the study and is honoring this request by the ToOLS developers at the conclusion of this study with information on results and conclusions.

Background and Psychometry of ToOLS. A review of the research literature revealed that the ToOLS instrument has been used for research studies in several Texas colleges and universities and according to the authors has a respectable psychometry regarding validity and reliability (Kerr, et. al., 2006). The original development and psychometric study of the instrument was conducted in three stages, which included development of the survey, determining the structure and reliability of the survey, and assessing the usefulness of the survey. Several other instruments were also used in developing and validating ToOLS; these are presented in Chapter II. Details of the three-stage development of ToOLS and its resultant factor analysis and internal reliability data are reported in Chapter II. Kerr, et al. (2006) reported that based on these results, ToOLS has been accepted as valid and internally reliable. It was therefore accepted for use in the present study.

Demographics Questionnaire. In the demographics portion of the survey for this study, a number of questions developed by the researcher were asked about students' background. This information was collected to fully describe the sample of students taking online courses who responded to the survey at Tulsa Community College. This online sample was compared with the entire known online student population and the general student population at the college. In addition, this background information was used to enable statistical analyses to identify subsets of the population that may

demonstrate low online readiness on ToOLS (Kerr, et. al., 2006) and thus might experience difficulty with online courses.

The demographics questions' response options used the same categories as Tulsa Community College uses to identify and place students. For example, the question on race/ethnicity used the same eight categories used by the college. This procedure enabled a direct comparison of groups in the sample and the population. The demographic categories and their options used by both this study and Tulsa Community College are those shown above in Tables 3 and 4. The demographic questions also asked about age and gender. Another portion of the questions revolved around the students' family and work life. These included questions on the number of hours students were working each week and their relationship status. Another portion was focused on education questions. These questions included student status (full or part time), the number of online college courses previously completed, and if the student placed in developmental courses. All response categories are shown above in Tables 3 and 4.

Data Sources

There were two data sources used in this study. All of the numerical data from both the preliminary study information and the results can be found in these two sources.

Institutional Research Data. Data was pulled from the Institutional Research database of Tulsa Community College. This data was used as preliminary information and for comparison with the obtained sample, as well as to enable analysis of relationships of ToOLS (Kerr, et. al., 2006) to grades in online courses. The institutional data included information from the spring of 2015 on the general student population enrolled, online student population enrolled, and final grade information for online

students (this required students' permission, as discussed below in the Procedures section). The categories of information used included race/ethnicity, gender, age, relationship status and student status for both the general and online population. General grade information was only pulled for the overall body of online students.

Survey Research Data. This data was collected for research during the study via online survey in the spring semester of 2015. The survey included the two instruments described above (i.e., demographics questions and ToOLS), combined and administered via Qualtrics in a single questionnaire.

Procedures

Approval to conduct the study and obtain all required data, including student grades, was obtained in January of 2015 in advance of conduct of the study by the researcher from Tulsa Community College. This approval was from the college's IRB and the Vice President of Student Services. Approval from Tulsa Community College was verified for the Oklahoma State University (OSU) IRB by the researcher as part of the documentation for the IRB application. The OSU IRB (Appendix 2) approved the study in early February of 2015.

Once the study was approved by the OSU IRB, information about the study and the survey instrument was first sent out via email in early February to all faculty in Tulsa Community College teaching online courses in the spring semester, the Associate Deans of these departments, and the Distance Learning Committee. The email explained what the survey entailed and the information the students were receiving in the following weeks via email. This information email can be found in Appendix 4.

Before the study questionnaire could be emailed to students, the list of online students' email addresses was loaded into the Qualtrics software. The list of online students and their corresponding school Outlook email addresses were obtained by the researcher from Tulsa Community College with the permission of the Associate Vice President of Student Services and the college's IRB. Students on the college's *Do Not Contact* list were removed from the list.

The survey was then sent out by the researcher via email to students at Tulsa Community College enrolled in online classes in the spring semester of 2015. A brief introduction letter as shown in Appendix 4 was included detailing the purpose of the study, who was conducting the study, contact information, the importance and significance of the study, informed consent information, and some general instructions for the survey. The link to the survey was provided to students via email starting in February 2015.

Table 5

Online Course Formats and Starting Dates during Semester of the Study

Course Length	Course Start Date
16 Weeks	January 12th
12 Weeks	January 12th
14 Weeks	January 26th
12 Weeks	January 26th
12 Weeks	February 2nd
12 Weeks	February 9th
8 Weeks	February 9th
8 Weeks	March 6th

Tulsa Community College offers online courses in several different formats with varying lengths. Table 5 shows the various course lengths and their starting date for the semester in which this study was conducted.

This course schedule meant it was necessary for students in multiple courses of varying lengths to receive the survey. The courses included in the study included all online courses longer than eight weeks in duration starting in or after spring of 2015. The eight-week classes which started in January of 2015 were excluded in this study due to the timing of the IRB approval. Students enrolled in more than one online course for the spring 2015 semester were emailed the invitation during their longest online course. All online students in the chosen course lengths received the email information and invitation to participate at an appropriate time at the beginning of the course, specifically during the first week of the course in the spring semester. This date varied depending upon the course start date. This timing was necessary because the ToOLS instrument is intended to be administered at the beginning of online courses.

The study's survey was emailed initially to 7,340 students at the appropriate times for their online course formats. A total of 390 students (5.31%) opened and started the online survey; however, only 319 students (4.35%) completed the survey. This small rate of return (N = 157, 2%) was further diminished due to elimination of survey completers on several criteria. From the completed surveys a number of students were immediately disqualified due to one of three items: age, permission to collect their end-of-semester grade(s) for the online course(s), and/or having previously taken ToOLS (Kerr, et. al., 2006).

In the beginning of the survey, students were asked several important questions to determine their eligibility to participate in the survey. Students were also asked for permission to collect their online course grades at the end of the course. This question was presented in an area of separate permission from the general survey permission and required an answer before advancing in the survey. End grades were necessary to determine if the ToOLS (Kerr, et. al., 2006) instrument was a good indicator for online learner readiness. Another question ascertained if the student was 18 years old or older. If students were not yet 18 years old at the time of the study, they were redirected immediately to the end of the survey and they received a brief message thanking them for their time. There was also an additional question asking students if they had already used the ToOLS instrument in the past. If students had already used ToOLS, they were redirected to the end of the survey as well, as students who had already taken the survey may have biased answers due to past experiences. Once students had answered these three questions, they were directed to the actual survey if they qualified to participate in the study.

After end of semester online grades were collected, additional students were dismissed from the study due to withdrawing from their online course(s). At this time, the actual cause of the withdrawal(s) could not be determined; therefore, the students were removed from the study. Thus, all online students who were qualified to participate, completed the research survey, did not withdraw, and granted permission for collection of their online course grade comprised the final obtained sample for the study.

The inclusion requirements further depleted the sample and resulted in a usable sample of N =157. It was recognized that this was a small sample for the original

available population of online students, and that this sample size limited the validity of some of the statistical procedures that were planned for the study, as well as the generalizability of the study's findings. These limitations are discussed in appropriate places in later chapters.

All surveys were administered uniformly online using Qualtrics software. All confidential data was collected and maintained by the researcher in a central, secure location in the researcher's office at the participating college according to procedures approved by the OSU IRB. The researcher personally reviewed and analyzed all data. Participants groups were de-identified after the grade collection to keep their identity confidential and to limit potential bias that might occur if the researcher was acquainted with any participants.

There were two follow-up emails sent to students. These emails were sent as a reminder to students who had not yet taken the survey. Students receiving the reminders were determined by the response status on the survey as determined by the Qualtrics software, and students who had already completed the survey or opted out of the survey did not receive the reminder emails. The timing of the reminder emails were dependent upon the length and starting dates of the class(es) in which students were enrolled. Sixteen-week and 12 -week courses received the reminders in the beginning of the second and third week of class. Eight-week classes received the reminders within the first two weeks of class.

Survey responses were not accepted after a certain length of time because individuals who have been taking an online course for multiple weeks may answer

ToOLS differently than at the beginning of a course. The cutoff time for each online course was based on the course completion dates and length.

At the end of the semester students' final grades in their online courses were collected by the researcher from the records system at Tulsa Community College and used as dependent measures for this study. If students were enrolled in more than one online class, all of the online class grades were collected as a single online grade point average (GPA) using weighted averaging as is typically used for determining GPA on a four-point system. For example, if a student took three online classes in the spring 2015 semester, the grades for all three classes would be used in calculation. This calculation is based on a GPA points system. A's are worth four points times the number of credit hours. B's are worth three points time the number of credit hours. C's are worth two points times the number of credit hours and D's are worth one point times the number of credit hours. To demonstrate this concept Student A took three classes in the spring of 2015. They took History for three credit hours, Biology for Majors for four credit hours, and Academic Strategies for three credit hours. In History the student earned a B which was worth three points for the B times three points for the credit hours. This gives the first class a total of nine points. For Biology, the student earned an A which equals four points for the A times four points for the credit hours equaling 16 points. For Academic Strategies, the student earned a total of six points based on a C for two points times three credit hours. In total, Student A earned 31 points. The researcher took the total number of points and divided by the total number of credit hours. For Student A, this would be 31 points divided by 10 credit hours which equals a 3.1. The points indicated which grade group the student fell into for the study. Four points equals an A; three points

equal a B; two points equals a C, one point equals a D, and zero points equals an F. These grades served as the grouping variable for the students.

Data Analysis

Statistical procedures. All data for the study was analyzed statistically using SPSS statistical software, version 22. Both descriptive and inferential procedures were used, according to that data analysis plans presented in Table 6. Descriptive statistics were run to describe the characteristics of the sample population and inferential statistics were also applied as appropriate for specific variables to "make inferences about the characteristics of the population the sample is alleged to represent" (Urdan, 2001, p. 60).

The statistics used in the data analysis included several types of tests. In regards to the ToOLS (Kerr, et. al., 2006) scores and the end of semester letter grades, the researcher used the 1-way ANOVA. The end of semester grades were used as the independent variables and the ToOLS scores were used as the dependent variable. This reversed the frequently-seen research situation where some type of test score is used to predict performance measures such as grades. The research question on ToOLS scores in conjunction with different demographic groups utilized both chi square test. For the test-retest, a Pearson Correlation was used and Cronbach's Alpha was used in measuring the internal consistency and reliability. Factor analysis was also planned to address the ToOLS instrument, but was prevented by sampling issues. This is explained in Chapter IV where findings are presented.

Table 6

Research Questions and Corresponding Data Analysis

Research Questions	Data Source	Planned Data
1. To what extent does ToOLs cover the readiness issues for online learning identified in the relevant research literature and thus have face validity?	Literature Review	Tabling of data and use of content analysis
2. To what extent is ToOLs a reliable instrument for measuring online learner readiness?	ToOLS Likert-Type Survey	Confirmatory factor analysis, Cronbach's Alpha, Pearson Correlation as appropriate
3. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?	ToOLS Likert-Type Survey	1-way ANOVA *Grades = Independent Variables Scores = Dependent Variables*
4. To what extent do ToOLS scores relate to demographic variables of students in online classes?	Demographic Questionnaire and ToOLs Likert-Type Survey	Chi-Square

In this study, the pieces of missing data appear to be random and encompass a limited number where the subjects either did not complete the survey or submitted the survey before completion. As such, the researcher chose to handle the missing data by "…evaluating for each variable with whatever data are available (regardless of whether or not each subject has provided a full set of data" (Sheskin, 2007, p. 469). Due to these missing pieces of data, there will be unequal Ns for the different analyses which indicates missing data. The missing data would also affect the different degrees of freedom (*df*)

used for analysis if needed in statistical calculations. This technique of handling missing data allowed the retention of the maximum amount of usable data rather than losing any data from elimination of cases with missing data. As Sheskin (2007, p. 469) points out, "when the overall amount of data is large (especially when the pattern of missing data is random), omission of a few subjects/pieces of data from an analysis will generally not cause serious problems." As indicated by the small variance in the Ns, this small amount of missing data shouldn't cause serious issues for the study.

CHAPTER IV

FINDINGS

Overview of Study

In this study, an online survey was disseminated to students at an urban, multi-campus two year college located in the Midwest. The original email with survey request was sent to 6,983 students during the spring of 2015. All of these students were currently enrolled in and taking an online class at the college. From this survey, there was a response from 390 students. Out of this number 319 students actually completed the survey. Students who were under 18 years of age, had previously taken the instrument, or did not give permission to collect their grades at the end of the semester were disqualified. This left the researcher with pool of 157 students with useable responses. The data for the research questions in this chapter was taken from that obtained sample of students.

This survey was compromised of two portions; demographic questions and the ToOLS (Kerr, et. al., 2006) instrument. The demographics portion of the survey asked participants about their age, race, gender, and school and work information. This part was researcher-developed and used the same terminology and categories currently in use at

the college. The second portion was compromised of the actual ToOLS instrument. This instrument reportedly measures a student's readiness to take online courses.

In the spring semester of 2015, the survey was administered to online students and data was collected. At the end of the semester, final grades were collected with permission from the students for only their online classes at the college. These grades were used as the dependent variables in the study. The independent variables came from ToOLS (Kerr, et. al., 2006) instrument answers and the demographic variables collected during the study.

Research Questions

1. To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have face validity?
2. To what extent is ToOLS a reliable instrument for measuring online learner readiness?
3. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?
4. To what extent do ToOLS scores relate to demographic variables of students in online classes?

Research Question #1: To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have face validity?

This research question was addressed through an examination on the topics covered in ToOLS and by comparing issues in readiness for online learning identified in the literature with those actually covered by the items in the ToOLS (Kerr, et. al., 2006) instrument. In Chapter II, 27 different factors were found more than once in previous

online learner readiness studies. These factors have been compared with the questions and topics found in the ToOLS instrument. In Table 7, the researcher has listed the factor found in other studies, some of the studies the factor was used in, and if that factor is covered by the ToOLS instrument. Due to the nature of some of the factors, a few of the ToOLS instrument questions were placed in multiple factor categories. The list of ToOLS instrument questions and their numbers can be found in Appendix 6.

Table 7

Readiness Issues Identified in Literature Compared with the ToOLS Instrument for Research Question 1

Factor	Studies	ToOLS Coverage
Active Learner/ Self-Learner	Alshare, Freeze, Lane & Wen, 2011; Boote, 1998; Cennamo & Ross, 2000; Connor, 2004; Michel, Cater & Varela, 2009; Smith, 2010; Whipp & Chiarelli, 2004; Willging & Johnson, 2004; Zimmerman, 2000	Independent Learning Skills Question: #20 Dependent Learning Skills Questions: #23, #26 Academic Skills Questions: #33, #34, #36, #41, #42, #43, #44
Age	Colorado & Eberle, 2010; Hong, 2002; Lim, Morris & Yoon, 2006; Muse, 2003; Wojciechowski & Palmer, 2005; Yukselturk & Bulut, 2007	Not Covered in ToOLS
Communication	Aargon & Johnson, 2008; Dabbagh, 2007; Dray, Lowenthal, Miszkiewicz, Ruiz-Primo & Marcynski, 2011; Mykota & Duncan, 2007; Parker, Hogan, Eastabrook, Oke & Wood, 2006; Smith, Murphy & Mahoney, 2003	Academic Skills Questions: #37, #40, #45
Completed Online Classes	Bandura, 2000; Hachey, Wladis, & Conway, 2012; Harrell & Bower, 2011; Hixon, Ralston-Berg, Buckenmeyer, & Barczyk, 2016; Mattice & Dixon, 1999; Muse, 2003; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Tyler-Smith, 2006	Not Covered in ToOLS

Computer Stability/Access	Harrell & Bower, 2011; Ibrahim, Silong & Samah, 2002; Mercado, 2008; Schrum & Hong, 2002; Standord-Bowers, 2008; Waschull, 2005	Not Covered in ToOLS
Computer Self-efficacy	Askar & Davenport, 2009; Barbeite & Weiss, 2004; Compeau & Higgins, 1995; Muse, 2003; Osika & Sharp, 2002; Pillay, Irving & Tones, 2007; Rhee, Verma, Plaschka & Kickul, 2007; Vuorela & Nummenmaa, 2004	Computer Skills Questions: #1, #2, #3, #5, #6, #7, #8, #9, #10
Course Design	Anderson & Garrison, 1998; Cantrell, O'Leary & Ward, 2008; Deka & McMurry, 2006; Eom, Wen & Ashill, 2006; Hachey, Wladis, & Conway, 2012; Hong, 2002; Ivankova & Stick, 2007; Jung, et. al, 2002; Kreijns, Kirschner, & Jochems, 2002; McKavanagh, Kanes, Beven, Cunningham & Choy, 2002; Ni, 2013; Moore, 1989; Muller, 2008; Romano, Wallace, Helmick, Carey & Adkins, 2005; Swan, 2004	Computer Skills Questions: #10, #11 Dependent Learning Skills Question: #26
Developmental Course Placement	Aargon & Johnson, 2008; Bailey, 2009; Bettinger & Long, 2005; Fike & Fike, 2008; Liu, Gomez, Khan, & Yen, 2007; Zavarella, 2008	Not Covered in ToOLS
Education Level	Bunn, 2004; Dupin-Bryant, 2004; Levy, 2007; Muse, 2003; Shin & Chan, 2004; Watson, 2005; Yukselturk & Bulut, 2007	Not Covered in ToOLS
Family & Friend Support	Bunn, 2004; Holder, 2007; Ivankova & Stick, 2007; Kemp, 2002; Muller, 2008; Park & Choi, 2009	Not Covered in ToOLS
Family Status	Bunn, 2004; Colorado & Eberle, 2010; Ivankova & Stick, 2007; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Muller, 2008	Not Covered in ToOLS
Financial Aid Status	Aragon and Johnson, 2008; Hachey, Wladis, and Conway, 2014; Lau, 2008; Lau & Shaikh, 2012;	Not Covered in ToOLS
Gender	Dabaj, 2009; Dell, Low, & Wilker, 2010; Harrell & Bower, 2011; Liu & Chang, 2010; Mattice & Dixon, 1999; Mueller, 2008; Muse, 2003; Nistor and Neubauer, 2010; Sullivan, 2001; Yukselturk & Bulut, 2007	Not Covered in ToOLS

GPA	Aragon & Johnson, 2008; Harrell & Bower, 2011; Menager-Beely, 2001; Morris, Finnegan & Wu, 2005; Muse, 2003; Osborn, 2001; Valasek, 2001	Not Covered in ToOLS
Learning Styles	Battalio, 2009; Davis, Nur, & Ruru, 1994; Devi, 2001; Felder & Soloman, 1999; Gatta, 2002; Harrell & Bower, 2011; Ho & Tabata, 2001; Hughes, 2002; James & Gardner, 1995; Mathes, 2003; Ramos, 2001; Schilke, 2001	Academic Skills Question: #39
Locus of Control	Golladay, Prybutok, & Huff, 2000; Harrell & Bower, 2011; Levy, 2007; Parker, 2005; Rotter, 1966; Yukselturk & Bulut, 2007; Yukselturk, 2009	Independent Learning Skills Questions: #17, #18, #20 Academic Skills Question: #44
Motivation	Artino, 2007; ChanLin, 2009; Dembo & Eaton, 2000; Frankola, 2001; Golladay, Prybutok, & Huff, 2000; Holder, 2007; Hongmei, 2002; Ivankova & Stick, 2007; Kemp, 2002; Li, 2002; Liu & Lin, 2010; Pillay, Irving & Tones, 2007; Sankaran & Tung, 2001; Smith, 2001; Zimmerman, 1984, 1994	Independent Learning Skills Question: #19 Dependent Learning Skills Question: #27
Need for Online Delivery	Dray, Lowenthal, Miszkiewicz, Ruiz-Primo & Marcynski, 2011; Mattice & Dixon, 1999; Muller, 2008	Need for Online Delivery Questions: #28, #29, #30, #31, #32
Prior Coursework	Bernt & Bugbee, 1993; Coggins, 1988; Dabbagh, 2007; Deka & McMurry, 2006; Dille & Mezack, 1991; Garrison, 1993; Gaytan, 2015; Johnstone & Connick, 2005; Li, 2002; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Moore & Kearsley, 2005; Williams, 2003; Xu & Jaggers, 2011	Not Covered in ToOLS
Procrastination	Elvers, Polzella, & Graetz, 2003; Goda, Yamada, Kato, Matsuda, Saito, & Miyagawa, 2015; Lay, 1986; Michinov, Brunot, Le Bohec, Juhel, & Delaval, 2001; Romano, Wallace, Helmick, Carey & Adkins, 2005; Solomon & Rothblum, 1984; Steel, 2007; Tan, Ang, Klassen, Yeo, Wong, Huan, & Chong, 2008; Tuckman, 2002, 2005, 2007	Independent Learning Skills Question: #14 Dependent Learning Skills Question: #22, #24

Race/Ethnicity	Angiello, 2002; Ke & Kwak, 2011; Lu, Yu & Liu, 2003; Moore, 2001; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Muilenburg & Berge, 2001;Sullivan 2011; Willging & Johnson, 2004	Not Covered in ToOLS
Relationship Status	Halsne & Gatta, 2002; Liu, Gomez & Yen, 2009; Muse, 2003;	Not Covered in ToOLS
Self-efficacy	Bandura, 1977, 1986, 1997; Bourrard-Bouchard, 1990; Holder, 2007; Kemp, 2002; Lane, Lane & Kyprianou, 2004; Ormrod, 2011; Park & Choi, 2009; Potosky & Ramakrishna, 2002; Schunk, 1991; Wang & Wu, 2008; Zimmerman, 2000	Independent Learning Skills Question: #21 Dependent Learning Skills Question: #25 Academic Skills Questions: #17, #18, #35
Student Enrollment Status	Aragon and Johnson, 2008; Colorado & Eberle, 2010; Halsne & Gatta, 2002; Moore, Bartkovich, Fetzner, & Sherrill, 2002; Muse, 2003; Park, 2007	Not Covered in ToOLS
Student Services Support	Bunn, 2004; Fairchild, 2003; Ivankova & Stick, 2007; Pullan, 2011; Simpson, 2003	Not Covered in ToOLS
Time Management	Bullen, 1998; Berge & Huang, 2004; Ivankova & Stick, 2007; Levy, 2007; Mandernach, Donnelli, & Dailey-Hebert, 2006; Nash, 2005; Selim, 2007; Stanford-Bowers, 2008; Vonderwell & Savery, 2004	Independent Learning Skills Questions: #12, #13, #15, #16
Web Self-efficacy	Alshare, Freeze, Lane & Wen, 2011; Bandura, 1997; Isman & Celikli, 2009; Moos & Azevedo, 2009; Ranganathan & Jah, 2007; Salanova, Grau, Cifre & Llorens, 2000; Tsai & Tsai, 2003; Wang & Newlin, 2002	Computer Skills Questions: #4, #10, #11
Work Status	Brey, 1988; Bunn, 2004; Conklin, 1991; Huang, 2002; Ibrahim, Silong, & Samah, 2002; Ivankova & Stick, 2007; Kemp, 2002; Muse, 2003	Not Covered in ToOLS

Over 27 factors were found in more than one previous research study. Of these factors, twelve of them are covered on the ToOLS (Kerr, et. al., 2006) instrument by at

least one question. Eight of the factors were covered in depth. Computer self-efficacy, web self-efficacy, and the need for online delivery were all covered in the ToOLS instrument; however, the need for online delivery was not as covered in the previous studies. Locus of control, self-efficacy, and active learning/self-directed learning were also well covered in the ToOLS instrument and previous research studies. Time management and procrastination were covered by a few questions on the instrument. They were also covered in other research studies but had varied results.

Fifteen factors were not covered in the ToOLS (Kerr, et. al., 2006) instrument. Of these 15 factors, seven of them were personal demographics. This includes factors such as age, gender, and race/ethnicity. In the studies reviewed, these factors had varied results depending upon the research population. These factors were also heavily influenced by other factors such as educational background, computer access and stability, and self-efficacy. The other eight factors dealt with educational background. This grouping including factors such as previously completed online coursework, GPA, and educational background. Prior coursework whether online or in another format and GPA were found to be significant in multiple research studies.

Overall, the ToOLS (Kerr, et. al., 2006) instrument covers many of factors found to be statistically significant in other studies. To fully cover the well-researched factors, some of the educational demographic variables should be added to the instrument such as educational background, computer access and stability, previous coursework both online and in traditional formats, and GPA. The Need for Online Delivery portion is not supported in the literature. This factor (or ability) did not seem to be statistically

significant in previous studies. This section speaks more to a student's motivation and drive behind why they are taking online classes versus if they truly need online classes.

Research Question #2: To what extent is ToOLS a reliable instrument for measuring online learner readiness?

2.a Does ToOLS present the factor structure expected from its organization?

It was the intent of the researcher to use factor analysis to examine the underlying structure of the ToOLS (Kerr, et. al., 2006) items, compare it to the structure established by the ToOLS authors, and test the fit of the ToOLS data obtained in the study to the item categories proposed for the instrument. However, two issues prevented this analysis, both related to sampling: (1) an apparent error in the sampling procedure used in the original factor analysis for ToOLS, and (2) the small size of the sample obtained for the present study.

In the original study, the factor analysis was based upon different mixed student groups for each phase of the study. Pooling of subjects from several populations can be problematic. Child (1990) stated that "Samples collected from different populations should not be pooled when computing correlations" (p. 11), on which factor analysis is based. The reason for not pooling is that "Factors which are specific to a population may become obscured when pooling is applied" (p. 11). The ToOLS (Kerr, et. al., 2006) authors used pooled populations for their initial factor analysis. Phase one of their study consisted of a pool of 188 students. This was a mix of 62 graduate students and 126 undergraduate students at a four year, public university. Phase two was comprised of 92 students from a public, four year university in Texas. This group had 21 graduate students and 71 undergraduate students. The third phase consisted of 140 pre-service teachers enrolled in an upper level education course at a public university. Thus, the sample in the

original study may have produced a factor analysis and factor structure that was not accurate specifically for community college students. This suggested that using this original factor structure to compare to one obtained in the present study would be inappropriate.

The second error stemmed from the small sample size obtained for the present study. It is well established in statistical literature that large samples are required to produce valid factor analyses. In discussing factor analysis, Child (1990) stated that "the rule should be, in applying tests of significance, to err on the side of rigor [sic] rather than leniency" (p.11). As a rule of thumb, in order to get reliable results, there should be a minimum of 10 responses for each question on the factor analysis (Nunnally, 1978). For a 45-question instrument like ToOLS (Kerr, et. al., 2006), there should therefore be a minimum of 450 responses. With this survey, the obtained sample was too small (N = 157) to produce a valid factor analysis. Large numbers are supported for factor analysis because it's based on correlations, and "correlation coefficients have a tendency to be less reliable when estimated from small samples. If unreliable – or at least, less reliable – correlations exist among variables, and those variables are subjected to factor analysis, the resultant factors will also not be very reliable" (Mertler & Vannatta, 2005, p. 258).

Based on these sampling considerations, the sample size obtained for this study was too small for both exploratory and confirmatory factor analysis. Also, the sample in the original factor analytic research on ToOLS (Kerr, et. al., 2006) may have been inappropriate for the community college population. Due to these sampling issues, the researcher therefore decided not to address this research question on the factor structure of ToOLS on the community college population. Instead the researcher chose to leave

this question unaddressed by this study and is proposing further research in Chapter V with a larger sample size. With the larger sample size, the researcher should be able establish a factor structure for ToOLS specifically for community college students, which is a population of interest for the researcher and this study.

2.b Does ToOLS present adequate internal consistency reliability?

Internal consistency reliability for the ToOLS instrument was tested using coefficient alpha. Due to missing data on some questions, 32 individuals were excluded from the analysis leaving 125 student responses. The coefficient alpha for the instrument was found to be .882, indicating a fairly high degree of internal consistency among the items on the instrument, as acceptable value for alpha is generally considered to approximately .70 (Sheskin, 2007). The means of the individual items ranged from 2.41 to 4.98 on a scale of one to five and the standard deviations ranged from .419 to .783. With a total possible instrument score of 225, the mean on the total ToOLS instrument was 191.22 (*SD* = 14.598). The mean and standard deviation of the items of the ToOLS instrument are provided in Table 8. These data indicate that while there was variability among the ToOLS items, none were strongly negative or detrimental to the overall reliability of the instrument.

Table 8

Mean and Standard Deviation of the Items in the ToOLS Instrument for Research Question 2(b)(N = 125)

Instrument Question	Mean	Standard Deviation
Capable of New Technology	4.78	0.419
Capable of Email	4.98	0.154
Capable of Attaching Email	4.97	0.177

Competent Internet Browser	4.94	0.246
Capable of Using Word Software	4.89	0.317
Capable of Managing Files	4.83	0.375
Capable of Downloading Software	4.76	0.545
Capable of Installing Software	4.74	0.567
Copy and Paste on Computer	4.94	0.246
Capable of Using Discussion Boards	4.86	0.408
Capable of Using Chat Rooms	4.77	0.570
Capable of Prioritizing Responsibilities	4.43	0.627
Good Time Manager	3.98	0.924
Procrastinator	2.93	1.271
Making Time for Coursework	4.45	0.602
Balance Many Tasks at One Time	4.18	0.741
Goal Oriented	4.51	0.630
Self-Disciplined with Studies	4.23	0.805
Self-Motivated	4.46	0.603
Responsibility for Learning	4.74	0.460
Capable of Critical Thinking	4.60	0.609
Leaves Tasks Unfinished	4.17	0.859
Requires Help for Written Instructions	4.41	0.774
Last Minute on Assignments	3.91	1.016
Trouble Comprehending Reading	4.35	0.873
Need Assignment Due Date Reminders	4.45	0.808
Need Rewards for Task Completion	4.20	1.008
Need Online Courses for Schedule	3.94	1.214
Difficult to Get to Campus	3.38	1.372
Need Online Due to Distance	2.41	1.351
Need Online Due to Work Schedule	3.66	1.454
Need Coursework on My Time	4.00	1.157
Learn by Working Independently	4.52	0.576
Self-Directed in Learning	4.38	0.758
Capable of Solving Problems Alone	4.50	0.630
Need Face to Face Interaction to Learn	3.57	1.088
Need Faculty Feedback on Assignments	2.58	1.131
Good Reader	4.42	0.785
Need Classroom Discussion to Learn	2.22	0.964
Capable of Asking for Help	4.50	0.617
Comfortable Learning New Skills	4.57	0.558
Read Carefully	4.23	0.824
Good Writer	4.04	0.902

Capable of Following Written Instructions	4.56	0.545
Conveying Ideas in Writing	4.30	0.783

2.c Does ToOLS present adequate test/retest reliability?

For the study, a number of students volunteered to take the test approximately two weeks from the first administration. These dates changed depending upon the class start date and length. Twenty- nine students completed both the original test and the re-test. A Pearson *r* Correlation Coefficient was run on the total ToOLS scores. The first set of scores were from the first administration of the survey. The second set of scores came from the exact same students used in the first round. The second set of scores was from the second administration of the same survey. Both rounds were conducted completely online and used the same demographics questions and ToOLS instrument questions in identical order. There was a significant Pearson correlation between the first set of test scores and the second set of test scores, r (df = 29) = .963, p < .01 as shown in Table 9. The descriptive statistics of the Original Test (M = 144.72, SD = 11.36) and the Retest (M = 144.76, SD = 9.76) were very close as shown in Table 10. The coefficient of determination was large (r^2= .93) which represents the percent of variance in one test score that is related to the other score. This coefficient gives the ToOLS instrument very high test-retest reliability over a short period of time.

Table 9

Description Statistics from the Pearson r Correlation Coefficient for Research Question 2(c)(N = 29)

Total Scores	Mean	Standard Deviation
Original	144.72	11.36
Retest	144.76	9.76

Table 10

Correlation Statistics from the Pearson r Correlation Coefficient on the Total ToOLS Scores for Research Question 2(c)(N = 29)

	Total Scores	
	Original	Retest
Pearson Correlation	1	.963**
Significance (2-tailed)		0

** Correlation is significant at the 0.01 level (2-tailed) and *r*-squared =.93

Research Question #3: To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?

Despite unequal variances among groups, all sub-questions in Research Question 3 were addressed with a one-way analysis of variance (ANOVA) instead of a non-parametric equivalent test, specifically, the Kruskal-Wallis test on ranks. The standard parametric one-way ANOVA was chosen because this test successfully compares group means on dependent variables across multiple groups, even when Levene's statistic indicates a lack of homogeneity of variance among the groups is present. The standard test was selected because according to Sheskin (2007), the ANOVA is generally robust to violation of the variance assumption and its other assumptions and ANOVA is the more

generally recognized statistical test. Due to the low number of frequencies in the D and F grade categories, the two categories were combined into a single group for statistical analysis. The ANOVA data for analyses shown to be significantly significant are shown in the text and Tables presented below for specific research sub-questions.

a. To what extent are ToOLS instrument total scores indicators of students' success in online classes?

   H_{O1}: There are no significant differences in total ToOLS scores among grade categories.
   H_{A1}: There are significant differences in total ToOLS scores among grade categories.

The null hypothesis 3(a) was rejected and the alternative hypothesis was accepted. ANOVA showed there were statistically significant differences in total ToOLS scores among grade categories. The total ToOLS scores did vary by grade categories, $F(3, 152) = 2.697$, $p = .048$, $\eta^2 = .051$. To locate the source of the significance, Tukey's *post hoc* procedure was performed and as shown below in Table 11 indicated that those in the C grade category ($M = 227.09$, $SD = 1.163$) made significantly lower scores then the student's in the grade category of D and F ($M = 243.71$, $SD = 1.027$). There were no statistically significant differences in the total overall ToOLS scores between any other grade categories.

Table 11

Tukey HSD on Overall ToOLS Scores for Research Question 3(a)(N = 152)

Grade Category (A)	Grade Category (B)	Mean Difference (A-B)	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
D & F	C	16.627*	6.045	.033	.92	32.33
	B	11.772	5.370	.130	-2.18	25.72
	A	9.386	5.241	.282	-4.23	23.00
C	D & F	-16.627*	6.045	.033	-32.33	-.92
	B	-4.855	4.466	.698	-16.46	6.75
	A	-7.241	4.310	.338	-18.44	3.95
B	D & F	-11.772	5.370	.130	-25.72	2.18
	C	4.855	4.466	.698	-6.75	16.46
	A	-2.386	3.296	.887	-10.95	6.18
A	D & F	-9.386	5.241	.282	-23.00	4.23
	C	7.241	4.310	.338	-3.95	18.44
	B	2.386	3.296	.887	-6.18	10.95

b. To what extent are Computer Skills as identified by ToOLS, including current technology skills, ability to learn new skills, and ability to maneuver online course features, indicators of students' success in online classes?

H_{O2}: There are no significant differences in Computer Skills scores among grade categories.
H_{A2}: There are significant differences in Computer Skills scores among grade categories.

The null hypothesis was retained. There were no significant differences in Computer Skills scores among grade categories as determined by one-way ANOVA, $F(3,152) = .544$, $p = .653$. Mean and standard deviations for the grade groups were: D and F ($M = 65.43$, $SD = 1.869$), C ($M = 64.26$, $SD = 5.056$), B ($M = 64.12$, $SD = 3.889$), and A ($M = 64.13$, $SD = .386$).

c. To what extent are Independent Learning skills as identified by ToOLS, including time management, goal orientation, motivation, responsibility and multitasking, indicators of students' success in online classes?

H_{O3}: There are no significant differences in Independent Learning skills scores among grade categories.
H_{A3}: There are significant differences in Independent Learning skills scores among grade categories.

The null hypothesis 3(c) was rejected and the alternative hypothesis was accepted. ANOVA showed there were statistically significant differences in Independent Learning scores among grade categories. The Independent Learning scores did vary by grade categories, $F(3, 152) = 2.721$, $p = .046$, $\eta^2 = .051$. Tukey's *post hoc* procedure as shown below in Table 12 indicated that those in the D and F grade category ($M = 55.21$, $SD = 3.378$) had significantly higher scores and less standard deviation then the students in the grade category of C ($M = 50.38$, $SD = 6.279$) and difference approaching significance for the B grade category ($M = 51.54$, $SD = 5.278$). There was not a statistically significant difference in Independent Learning scores between the A ($M = 52.67$, $SD = 52.67$) grade category and any other grade categories.

Table 12

Tukey HSD on Independent Learning Scores for Research Question 3(c)(N = 152)

Grade Category (A)	Grade Category (B)	Mean Difference (A-B)	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
D & F	C	4.388	1.711	.054	-.06	8.83
	B	3.676	1.520	.078	-.27	7.62
	A	2.543	1.483	.320	-1.31	6.40
C	D & F	-4.388	1.711	.054	-8.83	.06
	B	-.712	1.264	.943	-4.00	2.57
	A	-1.846	1.220	.432	-5.01	1.32
B	D & F	-3.676	1.520	.078	-7.62	.27
	C	.712	1.264	.943	-2.57	4.00
	A	-1.133	.933	.618	-3.56	1.29
A	D & F	-2.543	1.483	.320	-6.40	1.31
	C	1.846	1.220	.432	-1.32	5.01
	B	1.133	.933	.618	-1.29	3.56

d. To what extent are the Dependent Learning skills as identified by ToOLS, including procrastination, comprehension issues, and lack of motivation, indicators of students' success in online learning?

H_{O4}: There are no significant differences in Dependent Learning skills scores among grade categories.
H_{A4}: There are significant differences in Dependent Learning skills scores among grade categories.

The null hypothesis 3(d) was rejected and the alternative hypothesis was accepted. ANOVA showed there were statistically significant differences in Independent Learning scores among grade categories. The Dependent Learning scores did vary by grade categories, $F(3, 149) = 2.721$, $p < .001$, $\eta^2 = .063$. Tukey's *post hoc* procedure as shown below in Table 13 indicated that those in the C grade category ($M = 28.09$, $SD = 8.328$) had significantly lower scores indicating a higher need for dependent learning than the

student's in the grade category of A (*M* = 31.52, *SD* = 3.978); the difference approached significance for the D and F grade category (*M* = 32.21, *SD* = 2.392). There was not a statistically significant difference in Dependent Learning skills between the B (*M* = 30.50, *SD* = 4.975) grade category and any other grade category.

Table 13

Tukey HSD on Dependent Learning Scores for Research Question 3(d)(N = 149)

Grade Category (A)	Grade Category (B)	Mean Difference (A-B)	Standard Error	Significance	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
D & F	C	4.127	1.649	.064	-.16	8.41
	B	1.714	1.471	.650	-2.11	5.54
	A	.699	1.432	.962	-3.02	4.42
C	D & F	-4.127	1.649	.064	-8.41	.16
	B	-2.413	1.226	.205	-5.60	.77
	A	-3.428*	1.178	.021	-6.49	-.37
B	D & F	-1.714	1.471	.650	-5.54	2.11
	C	2.413	1.226	.205	-.77	5.60
	A	-1.015	.912	.682	-3.39	1.35
A	D & F	-.699	1.432	.962	-4.42	3.02
	C	3.428*	1.178	.021	.37	6.49
	B	1.015	.912	.682	-1.35	3.39

e. To what extent are the Need for Online Delivery variables as identified by ToOLS, including personal schedule with work and family and transportation problems, indicators of students' success in online learning?

H_{O5}: There are no significant differences in Need for Online Delivery scores among grade categories.
H_{A5}: There are significant differences in Need for Online Delivery scores among grade categories.

The null hypothesis was retained. There were no significant differences in Need for Online Delivery scores among grade categories as determined by one-way ANOVA, *F*

(3,150) = .610, p = .609. Mean and standard deviations for the grade groups were: the D and F (M = 23.57, SD = 6.665) grades, the C (M = 22.27, SD = 4.333) grades, the B (M = 21.88, SD = 5.034) grades, and the A (M = 21.64, SD = 4.747) grades.

f. To what extent are Academic Skills as identified by ToOLS, including self-direction, reading levels, writing skills, and need for interaction, indicators of students' success in online learning?

   H_{O6}: There are no significant differences in Academic Skills scores among grade categories.
   H_{A6}: There are significant differences in Academic Skills scores among grade categories.

The null hypothesis was retained. There were no significant differences in Academic Skills scores among grade categories as determined by one-way ANOVA, F(3,151) = .739, p = .530. Mean and standard deviations for the grade groups were: the D and F (M = 67.29, SD = 4.858) group, the C (M = 65.45, SD = 5.226) group, the B (M = 65.50, SD = 6.198) group, and the A (M = 64.84, SD = 5.548) group.

As a summary, Figure 4 shows most categories except for Dependent Learning exhibited their highest mean in the D grade category. In Academic Skills, the mean for the D grade category jumped considerably higher than the other grade categories. In the four skills categories, the mean score was higher in the F grade category than in the A grade category. Mean scores were slightly higher in the Independent Learning Skills, Dependent Learning Skills and the Need for Online Delivery categories. The lowest set of overall mean scores was found in the Need for Online Learning section of the instrument.

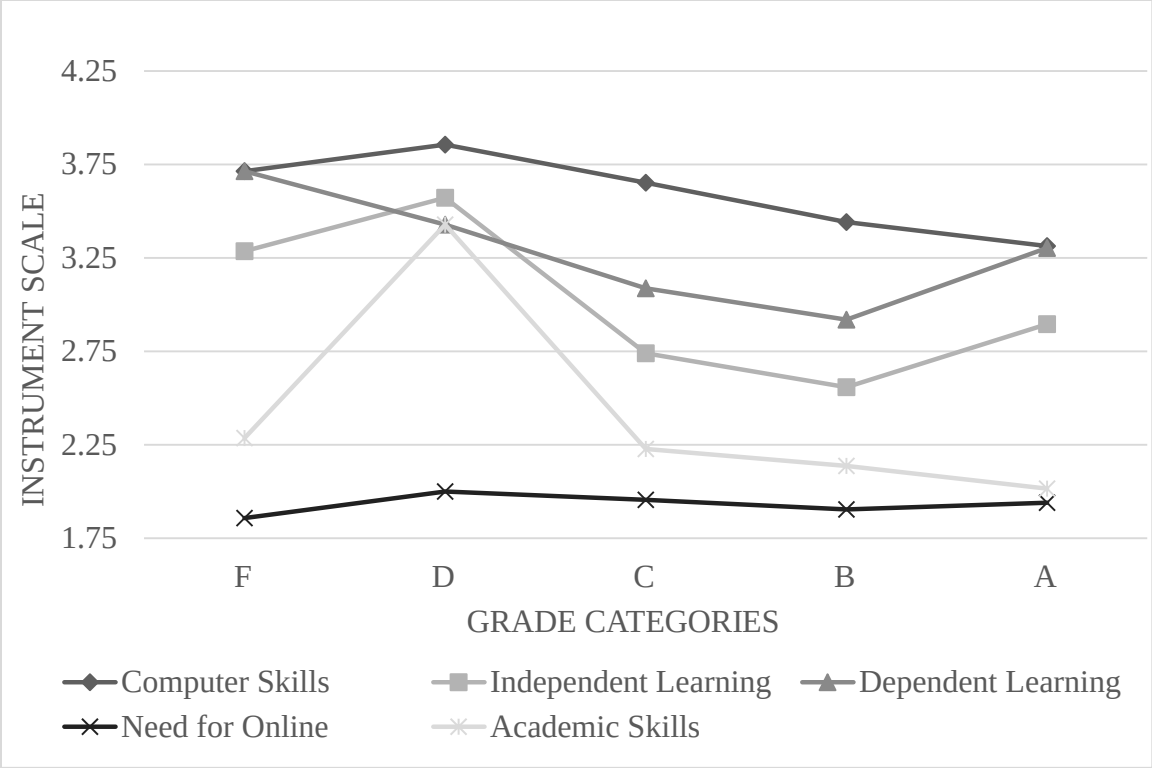

Figure 4. Mean Scores for each ToOLS Instrument category and the Overall Total Score Mean for the ToOLS Instrument based on the grade grouping.

Research Question #4: To what extent do ToOLS scores relate to demographic variables of students in online classes?

As part of the ToOLS (Kerr, et. al., 2006) scoring protocol, in the individual categories of the ToOLS instrument such as Computer Skills, Independent Learning Skills, Dependent Learning Skills and Academic Skills, scores for each section are used to place students' performance levels. These categories rely upon the mean score of each individual section. The scores are further broken down by percentiles for each section by color zones. The mean score range for each of these color zones changes in each section. The overall ToOLS score is a sum of the individual portions and follows the same color zone scheme. Each portion of the instrument and the overall scoring of the instrument has four color zones including Red, Orange, Yellow and Green. The colors mimic a stoplight with an additional orange section added. The Red Zone indicates the bottom

25% of student scores. Students falling in this section "…need to acquire additional skills in order to succeed in the online environment" (Kerr, 2016). The Red zone indicates major deficits in much needed skills sets. The Orange zone is next on the scale encompassing students between the 25% and the 50% quartile. If a student's scores fall into this zone, they "…are encouraged to seek additional information and assistance (Kerr, 2016)." The Orange zone indicates a few skills necessary for success are missing and students will need to work on them in order to be successful in online classes. The Yellow zone follows covering the 50% to the 75% of students and the Green zone covers the top 25% of students. Students who score in either of these categories "…are more prepared for online learning than 50 – 75 percent of their student peers (Kerr, 2016)." They should be prepared for online learning. This color coding scheme is mentioned several places in the discussion below. There is a complete copy of scoring instructions in Appendix 7.

Research Question #4 included the following specifics:

A. To what extent is gender an indicator of students' success in online learning?

H_{07}: There is no significant difference in gender distribution among grade categories.
H_{A7}: There is a significant difference in gender distribution among grade categories.

a_1: To what extent is gender an indicator of ToOLS instrument total scores?

H_{07a1} There is no significant difference in gender distribution among ToOLS instrument total scores.
H_{A7a1} There is a significant difference in gender distribution among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between gender and total ToOLS instrument scores by testing the difference between the observed

distribution of scores between genders with the distribution expected by chance. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 155) = .353, p = .950. There was no relation between gender and the total ToOLS scores; therefore, the null hypothesis was retained.

$a_{2:}$ To what extent is gender an indicator of Computer Skills scores?

H_{07a2} There is no significant difference in gender distribution among Computer Skills scores.
H_{A7a2} There is a significant difference in gender distribution among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between gender and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 155) = 4.818, p = .186. There was no relation between gender and the Computer skills scores; therefore, the null hypothesis was retained.

$a_{3:}$ To what extent is gender an indicator of Independent Learning skills scores?

H_{07a3} There is no significant difference in gender distribution among Independent Learning skills scores.
H_{A7a3} There is a significant difference in gender distribution among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between gender and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 155) = 2.653, p = .448. There was no relation between gender and the Independent Learning skills scores; therefore, the null hypothesis was retained.

a_4: To what extent is gender an indicator of Dependent Learning skills scores?

H_{07a4} There is no significant difference in gender distribution among Dependent Learning skills scores.

H_{A7a4} There is a significant difference in gender distribution among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between gender and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 152) = 1.440, p = .696. There was no relation between gender and the Dependent Learning skills scores; therefore, the null hypothesis was retained.

a_5: To what extent is gender an indicator of Need for Online Delivery scores?

H_{07a5} There is no significant difference in gender distribution among Need for Online Delivery scores.
H_{A7a5} There is a significant difference in gender distribution among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between gender and Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 153) = .829, p = .842. There was no relation between gender and the Need for Online Delivery scores; therefore, the null hypothesis was retained.

a_6: To what extent is gender an indicator of Academic Skills scores?

H_{07a6} There is no significant difference in gender distribution among Academic Skills scores.
H_{A7a6} There is a significant difference in gender distribution among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between gender and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 154) = .049, p = .826. There was no relation between gender and the Academic Skills scores; therefore, the null hypothesis was retained.

Collectively, the finding of the significance testing for the gender demographic and ToOLS scores was that these two variables are independent of each other.

b: To what extent is age an indicator of students' success in online learning?

H_{08}: There is no significant difference in age among grade categories.
H_{A8}: There is a significant difference in age among grade categories.

b_1: To what extent is age an indicator of ToOLS instrument total scores?

H_{08b1} There is no significant difference in age among ToOLS instrument total scores.
H_{A8b1} There is a significant difference in age among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between age categories and ToOLS instrument total scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 24, N = 157) = 10.158, p = .994. There was no relation between age categories and ToOLS instrument total scores; therefore, the null hypothesis was retained.

$b_{2:}$ To what extent is age an indicator of Computer Skills scores?

H_{08b2} There is no significant difference in age among Computer Skills scores.
H_{A8b2} There is a significant difference in age among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between age categories and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 21, N = 156) = 20.394, p = .496. There was no relation between age categories and Computer Skills scores; therefore, the null hypothesis was retained.

$b_{3:}$ To what extent is age an indicator of Independent Learning skills scores?

H_{08b3} There is no significant difference in age among Independent Learning skills scores.
H_{A8b3} There is a significant difference in age among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between age categories and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 21, N = 156) = 20.002, p = .521. There was no relation between age categories and Independent Learning skills scores; therefore, the null hypothesis was retained.

b_4: To what extent is age an indicator of Dependent Learning skills scores?

H_{08b4} There is no significant difference in age among Dependent Learning skills scores.
H_{A8b4} There is a significant difference in age among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between age categories and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 21, N = 153) = 11.463, p = .953. There was no relation between age categories and Dependent Learning skills scores; therefore, the null hypothesis was retained.

b_5: To what extent is age an indicator of Need for Online Delivery scores?

H_{08b5} There is no significant difference in age among Need for Online Delivery scores.
H_{A8b5} There is a significant difference in age among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between age categories and Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 7, N = 155) = 9.652, p = .209. There was no relation between age categories and Need for Online Delivery scores; therefore, the null hypothesis was retained.

b_6: To what extent is age an indicator of Academic Skills scores?

H_{08b6} There is no significant difference in age among Academic Skills scores.
H_{A8b6} There is a significant difference in age among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between age category and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was significant, χ^2 (df = 21, N = 154) = 34.591, p = .031.

The Academic Skills section follows the scoring scale in Figure 5. Multiple age categories had counts different than the expected count in the Red category. Some of these observed counts were above expected counts, while others were below the expected. Three age categories (18 – 19, 20 – 21, and 50 – 64) reported different numbers in the counts versus expected counts category in the Orange test score zone. Again, some of the age groups reported an increase in count numbers over the expected count number. Others reported a decreased in count number versus expected count numbers. In the Yellow zone, counts were less than two from the expected count numbers. In the Green score zone, there are once again differences between the count numbers and the expected count numbers.

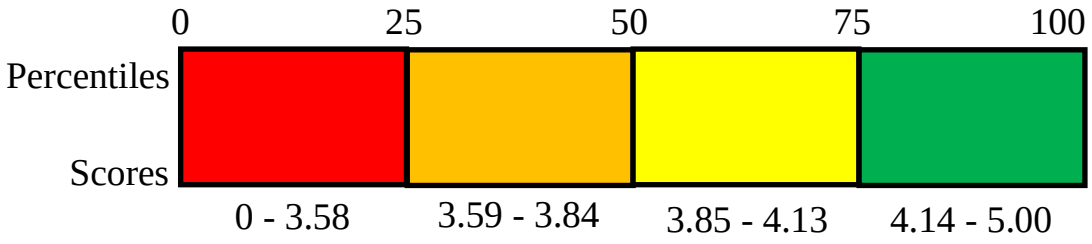

Figure 5. Scoring in both Percentiles and Mean Scores for Academic Skills

These differences range both above and below the expected count numbers. As can be seen by the frequencies tabulated in Table 14, there is a significant relationship

between age category and Academic Skills scores. The null hypothesis for research question 4(b_6) was rejected and the alternative hypothesis was accepted.

Table 14

Crosstabulation on Academic Skills Scores within Age Categories for Research Question 4(b_6)(N = 154)

Age Category		Overall Total Score Category				
		Red	**Orange**	**Yellow**	**Green**	**Total**
Age 18 - 19	Count	11	1	0	5	17
	Expected Count	7.8	3.3	1.1	4.7	17
	% within Category	64.70%	5.90%	0.00%	29.40%	100.00%
Age 20 - 21	Count	3	5	2	2	12
	Expected Count	5.5	2.3	0.8	3.4	12
	% within Category	25.00%	41.70%	16.70%	16.70%	100.00%
Age 22 - 24	Count	8	4	1	3	16
	Expected Count	7.4	3.1	1	4.5	16
	% within Category	50.00%	25.00%	6.30%	18.80%	100.00%
Age 25 - 29	Count	8	7	3	16	34
	Expected Count	15.7	6.6	2.2	9.5	34
	% within Category	23.50%	20.60%	8.80%	47.10%	100.00%
Age 30 - 34	Count	15	5	0	5	25
	Expected Count	11.5	4.9	1.6	7	25
	% within Category	60.00%	20.00%	0.00%	20.00%	100.00%
Age 35 - 39	Count	6	2	2	3	13
	Expected Count	6	2.5	0.8	3.6	13
	% within Category	46.20%	15.40%	15.40%	23.10%	100.00%
Age 40 - 49	Count	6	5	2	6	19
	Expected Count	8.8	3.7	1.2	5.3	19
	% within Race	31.60%	26.30%	10.50%	31.60%	100.00%

Age 50 - 64	Count	14	1	0	3	18
	Expected Count	8.3	3.5	1.2	5	18
	% within Category	77.80%	56.00%	0.00%	16.70%	100.00%
Total	Count	71	30	10	43	154
	% within Category	46.10%	19.50%	6.50%	27.90%	100.00%

Collectively, the finding of the significance testing for the age demographic and ToOLS scores was that these two variables are not independent of each other. Age appears to be related to academic skills.

C. To what extent is race/ethnicity an indicator of students' success in online learning?

H_{09}: There is no significant difference in race/ethnicity among grade categories.
H_{A9}: There is a significant difference in race/ethnicity among grade categories.

c_1: To what extent is race/ethnicity an indicator of ToOLS instrument total scores?

H_{09c1}There is no significant difference in race/ethnicity among ToOLS instrument total scores.
H_{A9c1} There is a significant difference in race/ethnicity among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and total ToOLS instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 18, N = 156) = 16.175, p =.580. There was no relation between race/ethnicity and the total ToOLS scores; therefore, the null hypothesis was retained.

$c_{2:}$ To what extent is race/ethnicity an indicator of Computer Skills scores?

H_{09c2} There is no significant difference in race/ethnicity among Computer Skills scores.
H_{A9c2} There is a significant difference in race/ethnicity among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and Computer Skills scores. The relation between these variables was significant, χ^2 (df = 18, N = 156) = 44.938, p = .001. Students identifying as white reported higher levels of computer skills scores than expected. Whereas, students identifying as Black/African American or Hispanic reported lower levels of computer skills scores. As can be seen by the frequencies tabulated in Table 15, there is a significant relationship between race/ethnicity and computer skills scores. The null hypothesis for research question 4(c_2) was rejected and the alternative hypothesis was accepted.

Table 15

Crosstabulation on Computer Skills Scores within Race/Ethnicity Categories for Research Question 4(c_2)(N = 156)

		Computer Skills Scores				
Race/Ethnicity		**Red**	**Orange**	**Yellow**	**Green**	**Total**
American Indian or Alaskan Native	Count	2	0	4	10	16
	Expected Count	1	1.1	3.5	10.4	16
	% within Race	12.5%	0.0%	25.0%	62.5%	100.0%
Asian	Count	0	0	1	2	3
	Expected Count	0.2	0.2	0.7	1.9	3.0
	% within Race	0.0%	0.0%	33.3%	66.7%	100.0%
Black or African American	Count	3	0	0	5	8
	Expected Count	0.5	0.6	1.7	5.2	8.0
	% within Race	37.5%	0.0%	0.0%	62.5%	100.0%
Hispanic	Count	2	1	2	4	9
	Expected Count	0.6	0.6	2.0	5.8	9.0
	% within Race	22.2%	11.1%	22.2%	44.4%	100.0%

More than one Race	Count	1	1	0	4	6
	Expected Count	0.4	0.4	1.3	3.9	6.0
	% within Race	16.7%	16.7%	0.0%	66.7%	100.0%
Native Hawaiian or Other Pacific Islander	Count	1	0	0	0	1
	Expected Count	0.1	0.1	0.2	0.6	1.0
	% within Race	100.0%	0.0%	0.0%	0.0%	100.0%
White	Count	1	9	27	76	113
	Expected Count	7.2	8.0	24.6	73.2	113.0
	% within Race	0.01%	8.0%	23.9%	67.3%	100.0%
Total	Count	10	11	34	101	156
	% within Race	6.4%	7.1%	21.8%	64.7%	100.0%

$c_{3:}$ To what extent is race/ethnicity an indicator of Independent Learning skills scores?

H_{09c3} There is no significant difference in race/ethnicity among Independent Learning skills scores.
H_{A9c3} There is a significant difference in race/ethnicity among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 18, N = 156) = 13.498, p =.761. There was no relation between race/ethnicity and Independent Learning skills scores; therefore, the null hypothesis was retained.

c_4: To what extent is race/ethnicity an indicator of Dependent Learning skills scores?

H_{09c4} There is no significant difference in race/ethnicity among Dependent Learning skills scores.
H_{A9c4} There is a significant difference in race/ethnicity among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 18, N = 153) = 17.857, p =.465. There was no relation between race/ethnicity and Dependent Learning skills scores; therefore, the null hypothesis was retained.

c_5: To what extent is race/ethnicity an indicator of Need for Online Delivery scores?

H_{09c5} There is no significant difference in race/ethnicity among Need for Online Delivery scores.
H_{A9c5} There is a significant difference in race/ethnicity among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and the Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 6, N = 155) = 10.971, p =.089. There was no relation between race/ethnicity and the Need for Online Delivery scores; therefore, the null hypothesis was retained, but this relationship did approach significance and may merit further investigation.

c_6: To what extent is race/ethnicity an indicator of Academic Skills scores?

H_{09c6} There is no significant difference in race/ethnicity among Academic Skills scores.
H_{A9c6} There is a significant difference in race/ethnicity among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between race/ethnicity and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 18, N = 154) = 10.868, p =.900. There was no relation between race/ethnicity and Academic Skills scores; therefore, the null hypothesis was retained.

Collectively, the finding of the significance testing for the race/ethnicity demographic and ToOLS scores was that these two variables are not independent of each other. Ethnicity appears to be related to computer skills and possibly to need for online delivery (which approached significance).

D. To what extent is relationship status an indicator of students' success in online learning?

H_{010}: There is no significant difference in relationship status among grade categories.
H_{A10}: There is a significant difference in relationship status among grade categories.

d_1: To what extent is relationship status an indicator of ToOLS instrument total scores?

H_{010d1} There is no significant difference in relationship status among ToOLS instrument total scores.
H_{A10d1} There is a significant difference in relationship status among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and the total ToOLS instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 9, N = 156) = 7.974, p =.537. There was no relation between a student's relationship status and the total ToOLS instrument scores; therefore, the null hypothesis was retained.

d_2: To what extent is relationship status an indicator of Computer Skills scores?

H_{010d2} There is no significant difference in relationship status among Computer Skills scores.
H_{A10d2} There is a significant difference in relationship status among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 9, N = 156)

= 12.818, p =.171. There was no relation between a student's relationship status and Computer Skills scores; therefore, the null hypothesis was retained.

> $d_{3:}$ To what extent is relationship status an indicator of Independent Learning skills scores?
>
> H_{010d3} There is no significant difference in relationship status among Independent Learning skills scores.
> H_{A10d3} There is a significant difference in relationship status among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 9, N = 156) = 9.203, p =.419. There was no relation between a student's relationship status and Independent Learning skills scores; therefore, the null hypothesis was retained.

> d_4: To what extent is relationship status an indicator of Dependent Learning skills scores?
>
> H_{010d4} There is no significant difference in relationship status among Dependent Learning skills scores.
> H_{A10d4} There is a significant difference in relationship status among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 9, N = 153) = 4.015, p =.910. There was no relation between a student's relationship status and Dependent Learning skills scores; therefore, the null hypothesis was retained.

d_5: To what extent is relationship status an indicator of Need for Online Delivery scores?

H_{010d5} There is no significant difference in relationship status among Need for Online Delivery scores.
H_{A10d5} There is a significant difference in relationship status among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and the Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 155) = .985, p =.805. There was no relation between a student's relationship status and the Need for Online Delivery scores; therefore, the null hypothesis was retained.

d_6: To what extent is relationship status an indicator of Academic Skills scores?

H_{010d6} There is no significant difference in relationship status among Academic Skills scores.
H_{A10d6} There is a significant difference in relationship status among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between a student's relationship status and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 9, N = 154) = 6.831, p =.655. There was no relation between a student's relationship status and Academic Skills scores; therefore, the null hypothesis was retained.

Collectively, the finding of the significance testing for the relationship status demographic and ToOLS scores was that these two variables are independent of each other.

E. To what extent is student enrollment status an indicator of students' success in online learning?

H_{011}: There is no significant difference in student enrollment status among grade categories.
H_{A11}: There is a significant difference in student enrollment status among grade categories.

e_1: To what extent is student enrollment status an indicator of ToOLS instrument total scores?

H_{011e1}There is no significant difference in student enrollment status among ToOLS instrument total scores.
H_{A11e1} There is a significant difference in student enrollment status among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and the total ToOLS instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = 2.073, p =.557. There was no relation between a student's enrollment status and the total ToOLS instrument scores; therefore, the null hypothesis was retained.

$e_{2:}$ To what extent is student enrollment status an indicator of Computer Skills scores?

H_{011e2} There is no significant difference in student enrollment status among Computer Skills scores.
H_{A11e2} There is a significant difference in student enrollment status among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = .454, p =.929. There was no relation between a student's enrollment status and Computer Skills scores; therefore, the null hypothesis was retained.

$e_{3:}$ To what extent is student enrollment status an indicator of Independent Learning skills scores?

H_{011e3} There is no significant difference in student enrollment status among Independent Learning skills scores.
H_{A11e3} There is a significant difference in student enrollment status among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = 1.134, p =.769. There was no relation between a student's enrollment status and Independent Learning skills scores; therefore, the null hypothesis was retained.

e_4: To what extent is student enrollment status an indicator of Dependent Learning skills scores?

H_{011e4} There is no significant difference in student enrollment status among Dependent Learning skills scores.
H_{A11e4} There is a significant difference in student enrollment status among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 153) = .158, p =.984. There was no relation between a student's enrollment status and Dependent Learning skills scores; therefore, the null hypothesis was retained.

e_5: To what extent is student enrollment status an indicator of Need for Online Delivery scores?

H_{011e5} There is no significant difference in student enrollment status among Need for Online Delivery scores.
H_{A11e5} There is a significant difference in student enrollment status among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and the Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 1, N = 155) = .151, p =.698. There was no relation between a student's enrollment status and the Need for Online Delivery scores; therefore, the null hypothesis was retained.

> e_6: To what extent is student enrollment status an indicator of Academic Skills scores?
>
> H_{011e6} There is no significant difference in student enrollment status among Academic Skills scores.
> H_{A11e6} There is a significant difference in student enrollment status among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between a student's enrollment status and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 154) = 2.127, p =.546. There was no relation between a student's enrollment status and Academic Skills scores; therefore, the null hypothesis was retained.

Collectively, the finding of the significance testing for the student enrollment status demographic and ToOLS scores was that these two variables are independent of each other.

F. To what extent is placement into a developmental course an indicator of students' success in online learning?

H_{012}: There is no significant difference in developmental course placement among grade categories.
H_{A12}: There is a significant difference in developmental course placement among grade categories.

f_1: To what extent is placement into a developmental course an indicator of ToOLS instrument total scores?

H_{012f1} There is no significant difference in developmental course placement among ToOLS instrument total scores.
H_{A12f1} There is a significant difference in developmental course placement among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and the total ToOLS instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = 2.795, p =.424. There was no relation between a student's placement into a developmental course and the total ToOLS instrument scores; therefore, the null hypothesis was retained.

$f_{2:}$ To what extent is placement into a developmental course an indicator of Computer Skills scores?

H_{012f2} There is no significant difference in developmental course placement among Computer Skills scores.
H_{A12f2} There is a significant difference in developmental course placement among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = 2.666, p =.446. There was no relation between a student's placement into a developmental course and Computer Skills scores; therefore, the null hypothesis was retained.

$f_{3:}$ To what extent is placement into a developmental course an indicator of Independent Learning skills scores?

H_{012f3} There is no significant difference in developmental course placement among Independent Learning skills scores.
H_{A12f3} There is a significant difference in developmental course placement among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 156) = 3.155, p =.368. There was no relation between a student's placement into a developmental course and Independent Learning skills scores; therefore, the null hypothesis was retained.

f_4: To what extent is placement into a developmental course an indicator of Dependent Learning skills scores?

H_{012f4} There is no significant difference in developmental course placement among Dependent Learning skills scores.
H_{A12f4} There is a significant difference in developmental course placement among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 153) = 1.360, p =.715. There was no relation between a student's placement into a developmental course and Dependent Learning skills scores; therefore, the null hypothesis was retained.

f_5: To what extent is placement into a developmental course an indicator of Need for Online Delivery scores?

H_{012f5} There is no significant difference in developmental course placement among Need for Online Delivery scores.
H_{A12f5} There is a significant difference in developmental course placement among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and the Need for Online Delivery scores. The relation between these variables was significant, χ^2 (df = 1, N = 155) = 3.882, p = .049. More students who placed into a developmental course did not need courses delivered online than expected; whereas, more students that did not place into developmental courses did need courses online than expected. As can be seen by the frequencies tabulated in Table 16, there is a significant relationship between a student's placement into a developmental course and the Need for Online Delivery scores. The null hypothesis for research question 4(f_5) was rejected and the alternative hypothesis was accepted.

Table 16

Crosstabulation on Need for Online Delivery Scores within Developmental Course Placements for Research Question 4(f_5)(N = 155)

Developmental Course Placement		Need for Online Delivery		
		Don't Need	Need	Total
Yes	Count	7	49	56
	Expected Count	4.0	52.0	56.0
	% within Category	12.50%	87.50%	100.00%
No	Count	4	95	99
	Expected Count	7.0	92.0	99.0
	% within Category	33.30%	33.30%	100.00%
Total	Count	11	144	155
	% within Category	7.10%	92.90%	100.00%

f_6: To what extent is placement into a developmental course an indicator of Academic Skills scores?

H_{012f6} There is no significant difference in developmental course placement among Academic Skills scores.
H_{A12f6} There is a significant difference in developmental course placement among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between a student's placement into a developmental course and Academic Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 3, N = 154) = 4.804, p =.187. There was no relation between a student's placement into a developmental course and Academic Skills scores; therefore, the null hypothesis was retained.

Collectively, the finding of the significance testing for the placement in a developmental course demographic and ToOLS scores was that these two variables are

not independent of each other. Developmental course placement appears to be related to need for online delivery.

G. To what extent is the number of online courses previously completed an indicator of students' success in online learning?

H_{013}: There is no significant difference in the number of previously completed online courses among grade categories.
H_{A13}: There is a significant difference in the number of previously completed online courses among grade categories.

g_1: To what extent is the number of online courses previously completed an indicator of ToOLS instrument total scores?

H_{013g1}There is no significant difference in the number of previously completed online courses among ToOLS instrument total scores.
H_{A13g1} There is a significant difference in the number of previously completed online courses among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and the total ToOLS instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 6, N = 155) = 5.139, p =.526. There was no relation between the number of online courses previously completed and the total ToOLS Instrument scores; therefore, the null hypothesis was retained.

$g_{2:}$ To what extent is the number of online courses previously completed an indicator of Computer Skills scores?

H_{013g2} There is no significant difference in the number of previously completed online courses among Computer Skills scores.
H_{A13g2} There is a significant difference in the number of previously completed online courses among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not

significant, χ^2 (df = 6, N = 155) = 2.239, p =.896. There was no relation between the number of online courses previously completed and Computer Skills scores; therefore, the null hypothesis was retained.

$g_{3:}$ To what extent is the number of online courses previously completed an indicator of Independent Learning skills scores?

H_{013g3} There is no significant difference in the number of previously completed online courses among Independent Learning skills scores.
H_{A13g3} There is a significant difference in the number of previously completed online courses among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 6, N = 155) = 6.153, p =.406. There was no relation between the number of online courses previously completed and Independent Learning skills scores; therefore, the null hypothesis was retained.

g_4: To what extent is the number of online courses previously completed an indicator of Dependent Learning skills scores?

H_{013g4} There is no significant difference in the number of previously completed online courses among Dependent Learning skills scores.
H_{A13g4} There is a significant difference in the number of previously completed online courses among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 6, N = 152) = 2.995, p =.809. There was no relation between the number of online courses previously completed and Dependent Learning skills scores; therefore, the null hypothesis was retained.

g_5: To what extent is the number of online courses previously completed an indicator of Need for Online Delivery scores?

H_{013g5} There is no significant difference in the number of previously completed online courses among Need for Online Delivery scores.
H_{A13g5} There is a significant difference in the number of previously completed online courses among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and the Need for Online Delivery scores. The relation between these variables was significant, χ^2 (df = 2, N = 154) = 6.978, p = .031. Two different levels in the number of completed online courses (None and 1 – 2 Online Courses) reported different counts from their expected counts. In the group of students that had not previously completed an online course, fewer students reported the need for online courses than projected. In the group of students that had previously completed 1 to 2 online courses, more students reported a need for online courses than projected. As can be seen by the frequencies tabulated in Table 17, there is a significant relationship between the number of online courses previously completed and the Need for Online Delivery scores. The null hypothesis for research question 4(g_5) was rejected and the alternative hypothesis was accepted.

Table 17

Crosstabulation on Need for Online Delivery Scores and Completed Online Courses for Research Question 4(g_5)(N = 154)

Completed Online Courses		Need for Online Delivery		
		Don't Need	Need	Total
No Online Courses	Count	8	55	63
	Expected Count	4.1	58.9	63
	% within Category	12.70%	87.30%	100.00%
1 - 2 Online Courses	Count	2	68	70
	Expected Count	4.5	65.5	70
	% within Category	2.90%	97.10%	100.00%
3 - 5 Online Courses	Count	0	21	21
	Expected Count	1.4	19.6	21
	% within Category	0.00%	100.00%	100.00%
Total	Count	10	144	154
	% within Category	6.50%	93.50%	100.00%

g_6: To what extent is the number of online courses previously completed an indicator of Academic Skills scores?

H_{013g6} There is no significant difference in the number of previously completed online courses among Academic Skills scores.
H_{A13g6} There is a significant difference in the number of previously completed online courses among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between the number of online courses previously completed and Academic Skills scores. The relation between these variables was significant, χ^2 (df = 6, N = 153) = 12.648, p = .049. Differences between the student count and the expected count were found in all of the categories for Academic Skills including Red, Orange, Yellow and Green. The mean scores of these different color categories are shown in Figure 5. All three categories of

previously completed online courses reported different counts in the Red zone indicating fewer academic skills than the expected counts. In the no previously completed online courses category, there was a significant increase in students reporting Academic Skills in the Red zone than expected. In the other two categories (1 – 2 Online Classes and 3 – 5 Online Classes) of previously completed online courses, there were fewer reported students in the Red zone than expected category indicating better academic skills. In the Green zone indicating the highest level of Academic Skills, there were fewer reported than expected in the no previously completed online courses category but more students than expected in the one to two previously completed online course category. As can be seen by the frequencies tabulated in Table 18, there is a significant relationship between the number of online courses previously completed and Academic Skills scores. The null hypothesis for research question 4(g_6) was rejected and the alternative hypothesis was accepted.

Table 18
Crosstabulation on Academic Skills Scores and Completed Online Courses for Research Question 4(g_6)(N= 153)

		Academic Skills Scores				
Completed Online Courses		Red	Orange	Yellow	Green	Total
No Online Courses	Count	36	10	5	12	63
	Expected Count	28.8	12.4	4.1	17.7	63
	% within Category	57.10%	15.90%	7.90%	19.00%	100.00%
1 - 2 Online Courses	Count	29	14	2	25	70
	Expected Count	32	13.7	4.6	19.7	70
	% within Category	41.40%	20.00%	2.90%	35.70%	100.00%
3 - 5 Online Courses	Count	5	6	3	6	20
	Expected Count	9.2	3.9	1.3	5.6	20
	% within Category	25.00%	30.00%	15.00%	30.00%	100.00%
Total	Count	70	30	10	43	153
	% within Category	45.80%	19.60%	6.50%	28.10%	100.00%

Collectively, the finding of the significance testing for the number of online courses previously completed demographic and ToOLS scores was that these two variables are not independent of each other. Number of courses taken previously appears to be related to need for online deliver and to academic skills.

H. To what extent is the number of hours worked each week an indicator of students' success in online learning?

H_{014}: There is no significant difference in the number of hours worked each week among grade categories.
H_{A14}: There is a significant difference in the number of hours worked each week among grade categories.

h_1: To what extent is the number of hours worked each week an indicator of ToOLS instrument total scores?

H_{014h1} There is no significant difference in the number of hours worked each week among ToOLS instrument total scores.
H_{A14h1} There is a significant difference in the number of hours worked each week among ToOLS instrument total scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and the total ToOLS Instrument scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 12, N = 156) = 15.447, p =.218. There was no relation between the number of hours worked each week and the total ToOLS Instrument scores; therefore, the null hypothesis was retained.

$h_{2:}$ To what extent is the number of hours worked each week an indicator of Computer Skills scores?

H_{014h2} There is no significant difference in the number of hours worked each week among Computer Skills scores.
H_{A14h2} There is a significant difference in the number of hours worked each week among Computer Skills scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and Computer Skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 12, N = 156) = 17.444, p =.134. There was no relation between the number of hours worked each week and Computer Skills scores; therefore, the null hypothesis was retained.

> $h_{3:}$ To what extent is the number of hours worked each week an indicator of Independent Learning skills scores?
>
> H_{014h3} There is no significant difference in the number of hours worked each week among Independent Learning skills scores.
> H_{A14h3} There is a significant difference in the number of hours worked each week among Independent Learning skills scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and Independent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 12, N = 156) = 15.150, p =.233. There was no relation between the number of hours worked each week and Independent Learning skills scores; therefore, the null hypothesis was retained.

> h_4: To what extent is the number of hours worked each week gender an indicator of Dependent Learning skills scores?
>
> H_{014h4} There is no significant difference in the number of hours worked each week among Dependent Learning skills scores.
> H_{A14h4} There is a significant difference in the number of hours worked each week among Dependent Learning skills scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and Dependent Learning skills scores. Crosstabulations were also calculated. The relation between these variables was not

significant, χ^2 (df = 12, N = 153) = 6.515, p =.888. There was no relation between the number of hours worked each week and Dependent Learning skills scores; therefore, the null hypothesis was retained.

> h_5: To what extent is the number of hours worked each week an indicator of Need for Online Delivery scores?
>
> H_{014h5} There is no significant difference in the number of hours worked each week among Need for Online Delivery scores.
> H_{A14h5} There is a significant difference in the number of hours worked each week among Need for Online Delivery scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and Need for Online Delivery scores. Crosstabulations were also calculated. The relation between these variables was not significant, χ^2 (df = 4, N = 155) = 7.160, p =.128. There was no relation between the number of hours worked each week and Need for Online Delivery scores; therefore, the null hypothesis was retained.

> h_6: To what extent is the number of hours worked each week an indicator of Academic Skills scores?
>
> H_{014h6} There is no significant difference in the number of hours worked each week among Academic Skills scores.
> H_{A14h6} There is a significant difference in the number of hours worked each week among Academic Skills scores.

A chi-square test of independence was performed to examine the relation between the number of hours worked each week and Academic Skills scores. The relation between these variables was significant, χ^2 (df = 12, N = 154) = 23.675, p = .023. The mean scores fall into one of the four color categories, Red, Orange, Yellow, or Green. The different mean scores for each category is shown in Table 19. In all categories of hours worked per a week, there were differences in the count versus the expected count in

the Red zone which indicates low academic skills. Students that work 10 hours or less per a week or not at all showed increased counts in the Red zone than were expected. Students who worked above 11 hours a week showed a decrease in the number of students in the Red zone than was expected. At the other end, students that worked less than 10 hours per a week reported fewer students than expected in the Green zone which indicates a high level of academic skills. Students that worked more than 21 hours per a week reported a higher count in the Green zone than expected. As can be seen by the frequencies tabulated in Table 19, there is a significant relationship between the number of hours worked each week and Academic Skills scores. The null hypothesis for research question 4(h_6) was rejected and the alternative hypothesis was accepted.

Collectively, the finding of the significance testing for the number of hours worked per week demographic and ToOLS scores was that these two variables are not independent of each other. Hours worked per week appears to be related to academic skills.

Table 19
Crosstabulation on Academic Skills Scores and Hours Worked for Research Question 4(h_6)(N = 154)

Weekly Hours Worked		Academic Skills Scores Red	Orange	Yellow	Green	Total
Don't Work	Count	26	6	0	7	39
	Expected Count	18	7.6	2.5	10.9	39
	% within Category	66.70%	15.40%	0.00%	17.90%	100.00%
0 - 10 Hours	Count	23	8	3	8	42
	Expected Count	19.4	8.2	2.7	11.7	42
	% within Category	54.80%	19.00%	7.10%	19.00%	100.00%
11 - 20 Hours	Count	11	7	5	10	33
	Expected Count	15.2	6.4	2.1	9.2	33
	% within Category	33.30%	21.20%	15.20%	30.30%	100.00%
21 - 30 Hours	Count	8	5	1	9	23
	Expected Count	10.6	4.5	1.5	6.4	23
	% within Category	34.80%	21.70%	4.30%	39.10%	100.00%
31 - 40 Hours	Count	3	4	1	9	17
	Expected Count	7.8	3.3	1.1	4.7	17
	% within Category	17.60%	23.50%	5.90%	52.90%	100.00%
Total	Count	71	30	10	43	154
	% within Category	46.10%	19.50%	6.50%	27.90%	100.00%

Summary of Findings

The content validity of the ToOLS (Kerr, et. al., 2006) instrument was assessed by comparing the content covered in is component items to issues reported in the research literature. In the literature review, 27 factors were covered in multiple research studies. Of these factors, 12 of them are currently covered by the ToOLS instrument. The main factor coverage area can be broken down into motivation/self-efficacy, computer skills, and time management. Computer skills and motivation/self-efficacy were found to have

significant results in multiple studies. The factor of time management displayed varied results in studies.

The fifteen remaining factors can be split into two groups; personal and educational demographics. Personal demographics contains factors such as age, gender, and race/ethnicity. These factors are easily influenced as far as readiness is concerned by other factors in research studies. Educational demographics covered factors such as GPA, educational level, and previously completed coursework. These factors were found to make a statistical significance in several studies but are not currently covered by ToOLS.

Overall ToOLS (Kerr, et. al., 2006) was found to be a reliable instrument for measuring online learner readiness. Due to small sample sizes, neither exploratory factor analysis nor confirmatory factor analysis could be performed on the data. On the other hand, the instrument showed a relatively high degree of internal consistency among the items listed on the instrument. The test-retest reliability was also very high over a short period of time.

With the research question addressing the relationship between ToOLS (Kerr, et. al., 2006) instrument scores as an indicator of online success at a community college, there were mixed results. For this research question, online success was determined by the end grade earned in the class. In the categories of Computer Skills, Academic Skills and the Need for Online Delivery, the total scores were found to be independent of the resulting grades in the online courses. The variables of total ToOLS scores and the resulting grades did appear to be related. In regards to the overall total score, there was a significant difference between the D/F grade category and the C grade category. This was

also found to be the case in the Independent Learning Skills category. In addition, the D/F grade category approached significant difference from the B grade category, while in the Dependent Learning Skills category, the C grade group was significantly different from the A grade group. The C grade group also approached significant difference with the D/F grade category.

There were also mixed results on research question number four in regards to the extent ToOLS (Kerr, et. al., 2006) scores are related to demographic variables of students in online classes. A few of the demographics were found to not be statistically significant. In the relationship status, gender, and student enrollment status demographics, the ToOLS scores were found to be independent of the demographic variables. However, in the age, race/ethnicity, number of hours worked per a week, testing into developmental courses, and the number of completed online courses, the variables appeared to be related. The findings for the age demographics and ToOLS scores showed that the two variables were related in the Academic Skills category. In the race/ethnicity demographic, ToOLS scores showed a relationship between Computer Skills and Race/Ethnicity. It also approached significance in the Need for Online Delivery category. In testing for the placement in a developmental course and the number of online courses previously completed, there was a relationship with the Need for Online Delivery. In the number of online courses previously completed and the number of hours worked per a week demographic categories, the variables were found to be related to academic skills scores.

These findings and their implications, along with recommendations for practice and for further research are discussed in Chapter V.

CHAPTER V

CONCLUSIONS

Overview of Study

In general, in higher education there is a current lack of understanding of student barriers to online learning success, lower than desired retention rates, and lack of an appropriate and thoroughly evaluated instrument for helping assess students' readiness for online courses and identify individuals who may experience difficulties. In this study, the ToOLS (Kerr, et. al., 2006) instrument was analyzed to see if it had acceptable psychometric properties and was a good indicator of student success in community colleges. The community college environment was chosen for this study because of its professional interest to the researcher and because community colleges are typically major providers of online education.

The analysis of the ToOLS (Kerr, et. al., 2006) instrument that was the focus of this study was accomplished via a research survey on a group of online students at a Tulsa Community College. The survey was originally distributed to 6,983 students enrolled in at least one online class during the spring of 2015 and included the ToOLS instrument and a demographic questionnaire developed by the researcher. There were 319 students that responded to the online survey. A number of these respondents were

eliminated due to age (i.e., under 18 years of age), having used the instrument before, or not giving permission to collect their end of semester grades. This limited the pool of responses to 157 students as the obtained sample. It was this pool of students that was used in the data analysis of the instrument to address a set of general research questions as well as specific questions and hypotheses applicable to statistical procedures.

The general research questions guiding this study were:

1. To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have face validity?
2. To what extent is ToOLS a reliable instrument for measuring online learner readiness?
3. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?
4. To what extent do ToOLS scores relate to demographic variables of students in online classes?

Summary of Principle Findings

Psychometric Properties of ToOLS

In summary, the ToOLS (Kerr, et. al., 2006) instrument is psychometrically sound, based on several criteria. First, ToOLS appears to have considerable content validity to assess students' online readiness. It does cover a majority of the readiness factors for online learning identified in relevant research literature. In the literature, motivation/self-efficacy played a large role in student's success in online courses. Computer and Web self-efficacy were also necessary skill sets for online students. Both these factors are well covered by ToOLS items. The instrument lacks some educational

demographic questions that have been shown to be statistically related to success in online courses in past studies. These include variables such as educational level, prior coursework both in the traditional format and in the online format, and GPA. Computer stability and access, mentioned in the literature, were also missing from the ToOLS instrument. Stability and access were seemingly more important issues or concerns then the need for online delivery as identified by ToOLS.

In regards to the psychometric property of reliability, ToOLS (Kerr, et. al., 2006) was found to be a reliable for measuring online learner readiness, both in terms of internal consistency and test-retest reliabilities. ToOLS displayed a relatively high degree of internal consistency among the items listed on the instrument (Cronbach's coefficient alpha = .82). Additionally, the test-retest reliability was also found to be very high over a short period of time (r^2= .93).

Regarding the factor structure of ToOLS (Kerr, et. al., 2006), this study was inconclusive. Due to the small sample size (N = 157) obtained compared to the number of items on ToOLS (45), it was inappropriate to conduct factor analysis procedures on the data. A second issue was a potential sampling flaw in the original factor analysis of ToOLS presented in the literature. Therefore, the factor structure of ToOLS could not be confirmed in this study.

ToOLS as an Indicator of Students' Success in Online Courses

While the ToOLS (Kerr, et. al., 2006) instrument presented in this study as valid and reliable, it was not found to be a good indicator of success in online classes in a community college environment. Overall there were mixed results among the different ToOLS item categories. The resulting grades in the online courses did not match well

with the students' scores on the instrument. In the item categories of Computer Skills, Academic Skills, and the Need for Online Delivery, the category scores were found to be independent of the resulting grades in the online courses. This suggests that the instrument was generally not a good indicator of success in these categories. There were a few significant results in the other categories such as the overall total score, the independent learning skills category, and the dependent learning skills category. In the overall total score, there was a statistical significance between those in the C grade category and those in the D/F grade category; however, students in the D/F grade category scored higher on the ToOLS instrument than the students in the C grade catetgory. In the Independent Learning Skills, the D/F grade category was statistically significant and had higher scores and less standard deviation than then the students in the C grade category. In Dependent Learning Skills, the A grade category was statistically significant and the D/F grade approached significance. The difference in mean scores between the two groups was not very big (i.e., A (M = 31.52) and D/F (M = 32.21)).

Overall, ToOLS (Kerr, et. al., 2006) did not emerge from this study as clearly related to students' grades in online courses. This general finding minimizes its value as an indicator of student online course success. While instructors may find specific items on ToOLS helpful in identifying students who may encounter specific difficulties in online courses, they may not find the instrument beneficial for anticipating success in online courses as defined by course grades. Other variables may be more useful for this purpose.

Relationship of ToOLS to Student Demographic Variables

In relation to how ToOLS scores related to the demographic variables of students in online classes, there were mixed results. In the relationship status, gender, and student enrollment status demographics, the ToOLS scores were found to be independent of these variables. Statistically significant relationships were found between ToOLS scores and the demographic variables of age, race/ethnicity, number of hours worked per a week, developmental course placement, and the number of previously completed online courses. Significances were not found in all ToOLS item categories for these demographics but were present for at least some item categories. There were no demographic variables related to the ToOLS item categories of independent learning skills category or the dependent learning skills category.

Conclusions and Discussion

Several major conclusions can be drawn from the findings of this study.

Conclusion #1: *There is no evidence that the ToOLS instrument should not be used based on its validity or reliability.*

This study found ToOLS (Kerr, et. al., 2006) presented good content validity, good internal consistency reliability, and strong test-retest reliability. However, available literature and the findings of this study suggest that some students demographic variables may relate to ToOLS scores, thus the validity and usefulness of ToOLS may be increased if some educational demographic questions are included with the instrument. The literature also suggests that computer stability and access should also be included in the Computer Skills or Need for Online Delivery category of ToOLS items.

Conclusion #2: *The factor structure for the TOOLS instrument has still not been established and should be examined in further research.*

The factor structure proposed for ToOLS (Kerr, et. al., 2006) in the research literature comprises 5 factors, specifically computer skills, independent learning skills, dependent learning skills, need for online learning, and academic skills. However this factor structure was perhaps flawed because it was established by combining samples from mixed populations. Kerr, Rynearson, & Kerr (2006) noted that this is inappropriate because it may mask factor structures unique to specific populations. The present study was also unable to explore the factor structure of ToOLS specifically in the community college population or to confirm its 5-factor fit to the obtained data due an obtained sample too small to produce reliable factor analysis results (Nunnally, 1978). Thus, the factor structure of ToOLS remains uncertain and more research is needed in this area, particularly in the context of community college students.

Conclusion #3: *The ToOLS instrument may be outdated as an indicator of students' success in online courses.*

The ToOLS (Kerr, et. al., 2006) instrument does not appear to have much strength as an indicator of grade outcomes in online classes. This may be a result of it being simply outdated in its concept and the factors on which it focuses. ToOLS was developed at a time (i.e., Study I in 2002, Study II in spring 2003, and Study III in fall 2003) when online courses were less common, expectations or demands for online course availability were lower, experience with self-directed online learning was less common and more diverse, preference for face-to-face learning was more pronounced, course delivery technology was less ubiquitous, and technology skill levels were more diverse. Today,

online course offerings are commonplace and the diversity of students taking these online classes has drastically increased. Students are no longer just taking online courses for flexibility; some students actually prefer the online courses to sitting in a classroom. In addition, there is a wider range of online offerings and a greater demand for quality online classes. These changes in the socio-technical environment may have caused ToOLS to no longer reflect the factors, influences, and variables that tie it to students' ability to learn effectively in an online environment. Other variables may now be more relevant in determining online success and can only be identified through new research.

While ToOLS (Kerr, et. al., 2006) may no longer be a strong indicator of students' success in online courses as defined by the grades they earn, the instrument may still have value for online instructors to help them identify students who may need additional help with specific problems in online courses. The reliability of ToOLS should be reassuring to instructors who wish to use the instrument for this purpose.

Conclusion #4: *ToOLS may benefit from some change of content.*

Based on the literature and findings from the present study, several changes can be suggested that may strengthen ToOLS (Kerr, et. al., 2006). First, the Need for Online Learning section can be removed or updated. Even the original ToOLS study did say the Need for Online Learning was more of a learner need than an ability and many of these questions could be answered in other sections. Further weakening the necessity or this item category is the finding that needing to take a course online did not seem to make a significant difference in a student's resulting grades.

The Computer Skills section of ToOLS (Kerr, et. al., 2006) also appears to need re-working. Based on the available literature, the updated section dealing with computers should include the following factors:

a. Computer Access and Stability: Students do take online courses without regular or stable access and there may still be some issues with the *digital divide*. Unfortunately, students without stable internet or computer access don't seem to be as successful as students with stable internet access and regular computer availability in their online courses, especially if there are other factors surrounding their ability to this computer and internet access such as family and/or work. Further, the findings of this study suggest that social factors may still contribute to issues in computer access and stability. Race did make a statistical significance in Computer Skills. Students identifying as white reported higher levels of computer skills scores than expected. Whereas, students identifying as Black/African American or Hispanic reported lower levels of computer skills scores expected. It is unclear as to whether these scores were based on background and socioeconomic status involving factors like access to a computer and internet stability.
b. Computer Self-efficacy and/or Computer Skills: There is a fine line between these two factors. Believing you have a skill set such as being able to upload a file and actually being able to upload a file are two different things. However, in an online survey, the study will reflect the student's belief unless there is a skills test associated with the survey.

c. Web Self-efficacy: Students need to know how to navigate the web efficiently and effectively to be able to conduct research. They should also be able to determine the validity of a website noting the differences between sources such as a database and a blog.

Conclusion #5: *Need for online courses, particularly due to work schedules, is no longer a major determinant for those choosing to take courses online.*

This study revealed that students don't necessarily take online courses due to work schedules. Over 50% of all students taking online courses worked ten hours or less indicating that online classes were not needed due to the number of hours being worked each week. There were more students reported in the red zone (i.e. lowest scoring zone that indicates that students are not ready for online classes) than expected in students working ten hours or less. On the other hand, there were fewer students reported in the red zone than expected in students working over 10 hours. This indicates that students are not simply taking online classes for the flexible schedule and convenience due to a hectic lifestyle with work schedules. It also shows that students working fewer hours had worse academic skills than those working more (over ten) hours each week.

Conclusion #6: *Other demographic variables should be added to the instrument for the best indication of online learning readiness and online learner success.*

Since the original study, demographic variables or skill sets may have changed. With the popularity of online classes rising, more groups of students have taken online classes; thus, the demographics of the online population have changed. This could include age, gender, race, educational level, and previously completed online courses.

Conclusion #7: *There was not one specific factor that could indicate if a student would be successful or unsuccessful in online classes.*

Through research there is not one clear factor that can predict whether a student will be successful online with any sort of regularity. For example, age, gender, work status, enrollment status, and/or race do not alone predict online course success. Instead, there seems to be a group of factors that may indicate success in online learning.

Conclusion #8: *The proposed framework for this study mixing theories from Bandura and Knowles was neither confirmed nor rejected.*

The proposed theoretical framework comprised both a process and an outcome component. The study focused on the outcome component, with the process component being beyond the scope of the study. The findings failed to completely support the hypothesized chain of proposed theoretical process, to online readiness as assessed by ToOLS (Kerr, et. al., 2006), to outcome of higher grades. However, the problem may be not the proposed theoretical process or the proposed relationship between readiness for online learning and outcomes of learning success. Rather, the problem may lie in the ToOLS instrument that was used to assess online readiness, which may be no longer relevant and appropriate. It may be that online *readiness* may need a different definition than that inherent in ToOLS. The study raised many questions regarding the proposed theoretical and conceptual frameworks for this study and illuminated the need for further research.

Implications and Significance

As online education continues to play a central role in the future of higher education (Allen & Seaman, 2013), the questions driving this research should continue to

be pertinent for online students. Continued development of what factors constitute online learner readiness should contribute to higher retention rates in online courses and help both students and faculty better understand the skills needed to succeed in this environment. Many individual factors identified from previous research and the ToOLS (Kerr, et. al., 2006) instrument were found to be of significance in several different student pools. Additionally, this study indicated portions that did not pertain to the community college students such as the need for online delivery. To date, the understanding of the specific group of factors for individual student populations that indicate online success is limited. This research added to that knowledge base. This study also purposed the merging of two theories, Knowles' (1980) theory of andragogy and the goals realization component of Bandura's (1991) social cognitive theory, for the first time, as far as the researcher could determine. This blended model was conceptually a good fit with the research and further studies are recommended for it. This study created new research and knowledge on online learner readiness for community college students. This finding contributes to the empirical, theoretical, and practical significance for online learner readiness.

Implications for Knowledge

This study represented a contribution to empirical literature by analyzing the ToOLS (Kerr, et. al., 2006) instrument for use specifically in community colleges. Prior studies of this instrument have been conducted in conjunction with a different population mainly consisting of four-year universities, mixing student populations of undergraduate and graduate students. While helpful to those specific groups, community colleges often have a different student population. Other studies on online learner readiness also involved

only a couple of select factors instead of the entire picture. Finally, there were also studies conducted over the entire group of factors but they used a different instrument.

Most of the studies involved from prior research literature approached inquiry using quantitative methods, mainly surveys. There were a few studies that also used qualitative methods in the form of focus groups. Online surveys does appear to be an ideal methodology to reach online students. Ideally, there would be a way to increase the number of respondents to these online surveys.

Prior literature was a useful foundation for the current study by illuminating the factors that had previously been studied and their significances in these studies. The literature covered multiple groups and factors, but most studies didn't cover all of the factors together. Instead they focused on two or three factors for that population. Many of these studies were also conducted a number of years ago. In the ever-changing world of technology, factors for online learner readiness may have changed over the past decade.

The findings of this study differed from these prior studies because it was focused solely on community college students. The current study found while the ToOLS (Kerr, et. al., 2006) instrument does cover many of the factors found to affect online learner readiness, it is missing a few educational demographic factors. These missing factors are a student's educational level, GPA, and prior coursework both online and in traditional class format. In addition, while it may be useful to alert students and faculty about possible weaknesses, it is not a good indicator of grades in those online courses. This empirical finding merits further exploration to the specific factors or grouping of factors that indicate success in online courses particularly for community college students.

Implications for Theory

This study also represented a contribution to the theory base. According to Jaccard and Jacoby (2010), good theories must be logically consistent, lead to compatible predictions, and be in agreement with known data. The proposed theoretical model of the combination of the Knowles's theory of andragogy and adult learners and Bandura's social cognitive theory appears to meet these criteria. Based on the data, the proposed theoretical model produced several predicted findings that are consistent with those of previous research. Jaccard and Jacoby (2010) also assert that a good theory is creative and novel. The proposed theoretical model for this research meets the criteria, proposing a unity of readiness theory, Knowles' adult learning theory and Bandura's social cognitive theory that has not been previously considered.

Finally, Jaccard and Jacoby (2010), suggest that a good theory should generate research activity. They state this is likely when a new theory is "...rich in scope, explicit, interesting, and useful" (p. 32). The proposed research theory model fits this description very well. The process it proposes addresses a readiness issue that is highly important to online educators and, if confirmed, can be useful in explaining the process and outcomes of online learning readiness. The process proposed still needs to be studied and verified through empirical research, based on techniques such as path analysis and structural equation modeling. This line of study can generate a line of research activity.

Practical Implications

The practical implications and significance of this study relate to the usefulness and validity of the ToOLS (Kerr, et. al., 2006) instrument for online instructors. The findings of this study suggest that while the ToOLS instrument does cover many of the

important factors of online learner readiness, it is not a good indicator of success in online courses. However, it may be a reliable and useful indicator of a few specific areas of weakness for online students.

Therefore, this study's primary contribution to practice is the knowledge that the ToOLS (Kerr, et. al., 2006) instrument should not be used to predict online success. Rather, it should be used to identify possible areas of weakness for online students and their faculty members. By identifying these areas of weakness early on, students should be referred to resources to help with these weaknesses. Due to the literature review and instrument comparison, community colleges should add several demographic variables in conjunction with the use of this instrument. These added variables may be better predictors of online success.

Recommendations

This study supports several recommendations for both practice and further research.

Recommendations for Further Research

Future areas of recommended research include:

1. A full factor analysis is recommended on this instrument. In order to conduct this analysis, there will need to be a larger pool of responses. These responses should be obtained from community college students only to maximize the reliability of the factor structure for this population.
2. A qualitative study is recommended to find out why students withdrew from their online courses. The reasoning behind these withdrawals could be invaluable in helping determine online learner readiness for future students.

3. Further research on the theoretical model proposed in this study needs to be conducted. This research should seek to confirm the proposed theorized process underlying the online readiness and the outcome of readiness leading to learning success. Re-instrumentation may be required in order to facilitate this research.
4. Future research on the class discipline in conjunction with readiness factors should be studied to see if there is a difference between upper level or lower level courses or the course discipline such as English classes versus biology classes.
5. Research on why students sign up for online courses would be interesting. With the low number of working hours for online students in this survey, what is the reason they choose to take online courses?
6. Students in the Fs and Ds category showed the highest means on the various sections of the ToOLS instrument in this study. Whereas, the A students should have shown higher instrument and category scores than the D or F students. More research needs to be conducted to figure out if these results were from the small pool of students that made a D or F, if life circumstances interfered with class success, or if students over estimated their skill sets on the survey.
7. A study on race/ethnicity and computer skill levels would be interesting. With certain ethnic groups scoring lower than expected on computer skills in this study, it would be interesting to see if lower scores are normal and what are the reasons behind the lower scores.
8. The test-retest validity should be run at time increments at more than two weeks to see how valid the instrument is after a longer period of time has passed.

Recommendations for Future Practice

Future recommendations for practice include:

1. Although not the best indicator for grades, the ToOLS instrument does cover a majority of the factor for online learner readiness. Some form of advisement after receiving instrument results may help prepare students for online courses or at least alert them to possible deficiencies and area resources for help.
2. When using the ToOLS (Kerr, et. al., 2006) instrument, add extra educational demographic questions such as educational level, prior coursework both online and in the traditional classroom setting, and GPA to the list of questions. This will help give a better picture of online learner readiness.
3. At the community college that participated in this study, students must withdraw in person after the first two weeks. For students withdrawing from online courses, a reason for the withdrawal could be obtained to help determine reasons why students are not completing the online course. These reasons could be used to remove barriers for online studies.
4. Before taking an online course, it would be helpful to require a student to take an online learner readiness survey such as ToOLS and/or a computer skills course before being allowed to enroll in online courses. Students with low scores in either area should not be allowed to take online courses or should do so with extra mentoring and support. They might even be required to take an orientation or beginning online course.

Final Thoughts

According to Allen & Seaman (2013), online learning is projected to be a growing and expansive area of higher education with colleges and universities continuing to offer more online courses in the future. Between increased online offerings and lower retention rates, higher education needs to make strides in determining a student's online learner readiness, their ability to be successful in online courses. This study opened a line of inquiry focused on a set of online learner readiness factors at community colleges specifically. It offered important analysis of psychometric properties and content of the ToOLS (Kerr, et. al., 2006) instrument for the community college population and suggestions for the instrument's uses and improvement. It also offered deeper understanding of the factors related to success in online learning in this specific group. The literature review and comparison also pointed out other possible indicating factors that are missing in the ToOLS instrument. Due to the timing of the original study and the different population, some of the factors might need to be changed and/or updated. In conclusion, there is much yet to be done to understand the complex grouping of factors need to be successful in online courses. Hopefully this study has brought the research community one step closer.

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APPENDICES

APPENDIX 1

Research Questions with Hypothesis

Research Questions

B. To what extent does ToOLS cover the readiness issues for online learning identified in the relevant research literature and thus have content validity?

C. To what extent is ToOLS a reliable instrument for measuring online learner readiness?

   a. Does ToOLS present the factor structure expected from its organization?

   b. Does ToOLS present adequate internal consistency reliability?

   c. Does ToOLS present adequate test/retest reliability?

D. To what extent are ToOLS instrument scores an indicator of success in online classes at a community college?

   b. To what extent are ToOLS instrument total scores indicators of students' success in online classes?

      H_{O1}: There are no significant differences in total ToOLS scores among grade categories.

      H_{A1}: There are significant differences in total ToOLS scores among grade categories.

   c. To what extent are Computer Skills as identified by ToOLS, including current technology skills, ability to learn new skills, and ability to maneuver online course features, indicators of students' success in online classes?

      H_{O2}: There are no significant differences in Computer Skills scores among grade categories.

      H_{A2}: There are significant differences in Computer Skills scores among grade categories.

   d. To what extent are Independent Learning skills as identified by ToOLS, including time management, goal orientation, motivation, responsibility and multitasking, indicators of students' success in online classes?

      H_{O3}: There are no significant differences in Independent Learning skills scores among grade categories.

H_{A3}: There are significant differences in Independent Learning skills scores among grade categories.

e. To what extent are the Dependent Learning skills as identified by ToOLS, including procrastination, comprehension issues, and lack of motivation indicators of students' success in online learning?

H_{O4}: There are no significant differences in Dependent Learning skills scores among grade categories.

H_{A4}: There are significant differences in Dependent Learning skills scores among grade categories.

f. To what extent are the Need for Online Delivery variables as identified by ToOLS, including personal schedule with work and family and transportation problems, indicators of students' success in online learning?

H_{O5}: There are no significant differences in Need for Online Delivery scores among grade categories.

H_{A5}: There are significant differences in Need for Online Delivery scores among grade categories.

g. To what extent are Academic Skills as identified by ToOLS, including self-direction, reading levels, writing skills, and need for interaction, indicators of students' success in online learning?

H_{O6}: There are no significant differences in Academic Skills scores among grade categories.

H_{A6}: There are significant differences in Academic Skills scores among grade categories.

E. To what extent do ToOLS scores relate to demographic variables of students in online classes?

a. To what extent is gender an indicator of students' success in online learning?

H_{07}: There is no significant difference in gender distribution among grade categories.

H_{A7}: There is a significant difference in gender distribution among grade categories.

a_1: To what extent is gender an indicator of ToOLS instrument total scores?

H_{07a1} There is no significant difference in gender distribution among ToOLS instrument total scores.

H_{A7a1} There is a significant difference in gender distribution among ToOLS instrument total scores.

$a_{2:}$ To what extent is gender an indicator of Computer Skills scores?

H_{07a2} There is no significant difference in gender distribution among Computer Skills scores.

H_{A7a2} There is a significant difference in gender distribution among Computer Skills scores.

$a_{3:}$ To what extent is gender an indicator of Independent Learning skills scores?

H_{07a3} There is no significant difference in gender distribution among Independent Learning skills scores.

H_{A7a3} There is a significant difference in gender distribution among Independent Learning skills scores.

a_4: To what extent is gender an indicator of Dependent Learning skills scores?

H_{07a4} There is no significant difference in gender distribution among Dependent Learning skills scores.

H_{A7a4} There is a significant difference in gender distribution among Dependent Learning skills scores.

a_5: To what extent is gender an indicator of Need for Online Delivery scores?

H_{07a5} There is no significant difference in gender distribution among Need for Online Delivery scores.

H_{A7a5} There is a significant difference in gender distribution among Need for Online Delivery scores.

a_6: To what extent is gender an indicator of Academic Skills scores?

H_{07a6} There is no significant difference in gender distribution among Academic Skills scores.

H_{A7a6} There is a significant difference in gender distribution among Academic Skills scores.

b. To what extent is age an indicator of students' success in online learning?

H_{08}: There is no significant difference in age among grade categories.

H_{A8}: There is a significant difference in age among grade categories.

b_1: To what extent is age an indicator of ToOLS instrument total scores?

H_{08b1} There is no significant difference in age among ToOLS instrument total scores.

H_{A8b1} There is a significant difference in age among ToOLS instrument total scores.

$b_{2:}$ To what extent is age an indicator of Computer Skills scores?

H_{08b2} There is no significant difference in age among Computer Skills scores.

H_{A8b2} There is a significant difference in age among Computer Skills scores.

$b_{3:}$ To what extent is age an indicator of Independent Learning skills scores?

H_{08b3} There is no significant difference in age among Independent Learning skills scores.

H_{A8b3} There is a significant difference in age among Independent Learning skills scores.

b_4: To what extent is age an indicator of Dependent Learning skills scores?

H_{08b4} There is no significant difference in age among Dependent Learning skills scores.

H_{A8b4} There is a significant difference in age among Dependent Learning skills scores.

b_5: To what extent is age an indicator of Need for Online Delivery scores?

H_{08b5} There is no significant difference in age among Need for Online Delivery scores.

H_{A8b5} There is a significant difference in age among Need for Online Delivery scores.

b_6: To what extent is age an indicator of Academic Skills scores?

H_{08b6} There is no significant difference in age among Academic Skills scores.

H_{A8b6} There is a significant difference in age among Academic Skills scores.

c. To what extent is race/ethnicity an indicator of students' success in online learning?

H_{09}: There is no significant difference in race/ethnicity among grade categories.

H_{A9}: There is a significant difference in race/ethnicity among grade categories.

c_1: To what extent is race/ethnicity an indicator of ToOLS instrument total scores?

H_{09c1} There is no significant difference in race/ethnicity among ToOLS instrument total scores.

H_{A9c1} There is a significant difference in race/ethnicity among ToOLS instrument total scores.

$c_{2:}$ To what extent is race/ethnicity an indicator of Computer Skills scores?

H_{09c12} There is no significant difference in race/ethnicity among Computer Skills scores.

H_{A9c2} There is a significant difference in race/ethnicity among Computer Skills scores.

$c_{3:}$ To what extent is race/ethnicity an indicator of Independent Learning skills scores?

H_{09c3} There is no significant difference in race/ethnicity among Independent Learning skills scores.

H_{A9c3} There is a significant difference in race/ethnicity among Independent Learning skills scores.

c_4: To what extent is race/ethnicity an indicator of Dependent Learning skills scores?

H_{09c4} There is no significant difference in race/ethnicity among Dependent Learning skills scores.

H_{A9c4} There is a significant difference in race/ethnicity among Dependent Learning skills scores.

c_5: To what extent is race/ethnicity an indicator of Need for Online Delivery scores?

H_{09c5} There is no significant difference in race/ethnicity among Need for Online Delivery scores.

H_{A9c5} There is a significant difference in race/ethnicity among Need for Online Delivery scores.

c_6: To what extent is race/ethnicity an indicator of Academic Skills scores?

H_{09c6} There is no significant difference in race/ethnicity among Academic Skills scores.

H_{A9c6} There is a significant difference in race/ethnicity among Academic Skills scores.

d. To what extent is relationship status an indicator of students' success in online learning?

H_{010}: There is no significant difference in relationship status among grade categories.

H_{A10}: There is a significant difference in relationship status among grade categories.

d_1: To what extent is relationship status an indicator of ToOLS instrument total scores?

H_{010d1} There is no significant difference in relationship status among ToOLS instrument total scores.

H_{A10d1} There is a significant difference in relationship status among ToOLS instrument total scores.

$d_{2:}$ To what extent is relationship status an indicator of Computer Skills scores?

H_{010d2} There is no significant difference in relationship status among Computer Skills scores.

H_{A10d2} There is a significant difference in relationship status among Computer Skills scores.

$d_{3:}$ To what extent is relationship status an indicator of Independent Learning skills scores?

H_{010d3} There is no significant difference in relationship status among Independent Learning skills scores.

H_{A10d3} There is a significant difference in relationship status among Independent Learning skills scores.

d_4: To what extent is relationship status an indicator of Dependent Learning skills scores?

H_{010d4} There is no significant difference in relationship status among Dependent Learning skills scores.

H_{A10d4} There is a significant difference in relationship status among Dependent Learning skills scores.

d_5: To what extent is relationship status an indicator of Need for Online Delivery scores?

H_{010d5} There is no significant difference in relationship status among Need for Online Delivery scores.

H_{A10d5} There is a significant difference in relationship status among Need for Online Delivery scores.

d_6: To what extent is relationship status an indicator of Academic Skills scores?

H_{010d6} There is no significant difference in relationship status among Academic Skills scores.

H_{A10d6} There is a significant difference in relationship status among Academic Skills scores.

e. To what extent is student enrollment status an indicator of students' success in online learning?

H_{011}: There is no significant difference in student enrollment status among grade categories.

H_{A11}: There is a significant difference in student enrollment status among grade categories.

e_1: To what extent is student enrollment status an indicator of ToOLS instrument total scores?

H_{011e1} There is no significant difference in student enrollment status among ToOLS instrument total scores.

H_{A11e1} There is a significant difference in student enrollment status among ToOLS instrument total scores.

$e_{2:}$ To what extent is student enrollment status an indicator of Computer Skills scores?

H_{011e2} There is no significant difference in student enrollment status among Computer Skills scores.

H_{A11e2} There is a significant difference in student enrollment status among Computer Skills scores.

$e_{3:}$ To what extent is student enrollment status an indicator of Independent Learning skills scores?

H_{011e3} There is no significant difference in student enrollment status among Independent Learning skills scores.

H_{A11e3} There is a significant difference in student enrollment status among Independent Learning skills scores.

e_4: To what extent is student enrollment status an indicator of Dependent Learning skills scores?

H_{011e4} There is no significant difference in student enrollment status among Dependent Learning skills scores.

H_{A11e4} There is a significant difference in student enrollment status among Dependent Learning skills scores.

e_5: To what extent is student enrollment status an indicator of Need for Online Delivery scores?

H_{011e5} There is no significant difference in student enrollment status among Need for Online Delivery scores.

H_{A11e5} There is a significant difference in student enrollment status among Need for Online Delivery scores.

e_6: To what extent is student enrollment status an indicator of Academic Skills scores?

H_{011e6} There is no significant difference in student enrollment status among Academic Skills scores.

H_{A11e6} There is a significant difference in student enrollment status among Academic Skills scores.

f. To what extent is placement into a development course an indicator of students' success in online learning?

H_{012}: There is no significant difference in development course placement among grade categories.

H_{A12}: There is a significant difference in development course placement among grade categories.

f_1: To what extent is placement into a development course an indicator of ToOLS instrument total scores?

H_{012f1} There is no significant difference in development course placement among ToOLS instrument total scores.

H_{A12f1} There is a significant difference in development course placement among ToOLS instrument total scores.

$f_{2:}$ To what extent is placement into a development course an indicator of Computer Skills scores?

H_{012f2} There is no significant difference in development course placement among Computer Skills scores.

H_{A12f2} There is a significant difference in development course placement among Computer Skills scores.

$f_{3:}$ To what extent is placement into a development course an indicator of Independent Learning skills scores?

H_{012f3} There is no significant difference in development course placement among Independent Learning skills scores.

H_{A12f3} There is a significant difference in development course placement among Independent Learning skills scores.

f_4: To what extent is placement into a development course an indicator of Dependent Learning skills scores?

H_{012f4} There is no significant difference in development course placement among Dependent Learning skills scores.

H_{A12f4} There is a significant difference in development course placement among Dependent Learning skills scores.

f_5: To what extent is placement into a development course an indicator of Need for Online Delivery scores?

H_{012f5} There is no significant difference in development course placement among Need for Online Delivery scores.

H_{A12f5} There is a significant difference in development course placement among Need for Online Delivery scores.

f_6: To what extent is placement into a development course an indicator of Academic Skills scores?

H_{012f6} There is no significant difference in development course placement among Academic Skills scores.

H_{A12f6} There is a significant difference in development course placement among Academic Skills scores.

h. To what extent is the number of online courses previously completed an indicator of students' success in online learning?

H_{013}: There is no significant difference in the number of previously completed online courses among grade categories.

H_{A13}: There is a significant difference in the number of previously completed online courses among grade categories.

g_1: To what extent is the number of online courses previously completed an indicator of ToOLS instrument total scores?

H_{013g1} There is no significant difference in the number of previously completed online courses among ToOLS instrument total scores.

H_{A13g1} There is a significant difference in the number of previously completed online courses among ToOLS instrument total scores.

$g_{2:}$ To what extent is the number of online courses previously completed an indicator of Computer Skills scores?

H_{013g2} There is no significant difference in the number of previously completed online courses among Computer Skills scores.

H_{A13g2} There is a significant difference in the number of previously completed online courses among Computer Skills scores.

$g_{3:}$ To what extent is the number of online courses previously completed an indicator of Independent Learning skills scores?

H_{013g3} There is no significant difference in the number of previously completed online courses among Independent Learning skills scores.

H_{A13g3} There is a significant difference in the number of previously completed online courses among Independent Learning skills scores.

g_4: To what extent is the number of online courses previously completed an indicator of Dependent Learning skills scores?

H_{013g4} There is no significant difference in the number of previously completed online courses among Dependent Learning skills scores.

H_{A13g4} There is a significant difference in the number of previously completed online courses among Dependent Learning skills scores.

g_5: To what extent is the number of online courses previously completed an indicator of Need for Online Delivery scores?

H_{013g5} There is no significant difference in the number of previously completed online courses among Need for Online Delivery scores.

H_{A13g5} There is a significant difference in the number of previously completed online courses among Need for Online Delivery scores.

g_6: To what extent is the number of online courses previously completed an indicator of Academic Skills scores?

H_{013g6} There is no significant difference in the number of previously completed online courses among Academic Skills scores.

H_{A13g6} There is a significant difference in the number of previously completed online courses among Academic Skills scores.

i. To what extent is the number of hours worked each week an indicator of students' success in online learning?

H_{014}: There is no significant difference in the number of hours worked each week among grade categories.

H_{A14}: There is a significant difference in the number of hours worked each week among grade categories.

h_1: To what extent is the number of hours worked each week an indicator of ToOLS instrument total scores?

H_{014h1} There is no significant difference in the number of hours worked each week among ToOLS instrument total scores.

H_{A14h1} There is a significant difference in the number of hours worked each week among ToOLS instrument total scores.

$h_{2:}$ To what extent is the number of hours worked each week an indicator of Computer Skills scores?

H_{014h2} There is no significant difference in the number of hours worked each week among Computer Skills scores.

H_{A14h2} There is a significant difference in the number of hours worked each week among Computer Skills scores.

$h_{3:}$ To what extent is the number of hours worked each week an indicator of Independent Learning skills scores?

H_{014h3} There is no significant difference in the number of hours worked each week among Independent Learning skills scores.

H_{A14h3} There is a significant difference in the number of hours worked each week among Independent Learning skills scores.

h_4: To what extent is the number of hours worked each week gender an indicator of Dependent Learning skills scores?

H_{014h4} There is no significant difference in the number of hours worked each week among Dependent Learning skills scores.

H_{A14h4} There is a significant difference in the number of hours worked each week among Dependent Learning skills scores.

h_5: To what extent is the number of hours worked each week an indicator of Need for Online Delivery scores?

H_{014h5} There is no significant difference in the number of hours worked each week among Need for Online Delivery scores.

H_{A14h5} There is a significant difference in the number of hours worked each week among Need for Online Delivery scores.

h_6: To what extent is the number of hours worked each week an indicator of Academic Skills scores?

H_{014h6} There is no significant difference in the number of hours worked each week among Academic Skills scores.

H_{A14h6} There is a significant difference in the number of hours worked each week among Academic Skills scores.

APPENDIX 2

Tulsa Community College IRB Approval

Tulsa Community College
Institutional Review Board
Decision Notification

Date: January 26, 2015

IRB#: IRB-150116

Project Title: An Analysis of the ToOLS Online Readiness Instrument as an Indicator of Student Success in Online Courses in a Community College Environment

Principal Investigator: Ephanie DeBey

Your research proposal has been approved by the Institutional Review Board at Tulsa Community College. You are authorized to begin your research under the auspices of TCC's IRB on the start date listed on your application or the date of this communication, if your proposed start date has passed. Your project approval is valid until the end date listed on your application or for one year after the approval of your study, whichever is earlier. After this approval period, you will be required to submit a continuation or renewal request for board approval, if you wish to continue your research project. This project has been approved as described in the IRB application. Any changes to the research project, such as the use of additional questionnaires or data, will need to be approved by the IRB. Please contact us if you have any questions regarding your IRB approval. We wish you luck in your research.

Sincerely,

Drs. Kevin David and
Connie Hebert Co-Chairs,
Institutional Review Board

APPENDIX 3

Oklahoma State University IRB Approval

Oklahoma State University Institutional Review Board

Date:	Wednesday, February 04, 2015
IRB Application No	ED1511
Proposal Title:	An Analysis of the ToOLS Online Readiness Instrument as an Indicator of Student Success in Online Courses in a Community College Environment
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 2/3/2018

Principal Investigator(s):

Ephanie DeBoy
5877 E 22nd St
Tulsa, OK 74114

Lynna Ausburn
257 Willard
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

☒Completion of required IRB training (http://compliance.vpr.okstate.edu/IRB/gs-CITI.aspx)
☐Grant Proposal, if research is externally funded
☐Outline or script of information to be provided prior to subjects' agreement to participate
☒Copies of flyers, announcements or other forms of recruitment
☐Informed consent/child assent/parental permission forms
☒Instrument(s) [questionnaire, survey, tests]
☒Résumés or CVs for all PIs (faculty or student) and advisors (**4 page maximum for each**)*

*CVs should highlight the education and research expertise of the researcher. Researchers may submit CVs prepared for federal grant proposals (e.g., NIH, NSF, USDA, etc.).

Appendices Included:

☐Appendix A - Request for OSU System Email Addresses for Human Subject Research Recruitment Purposes

Number of copies:
One (1), **single sided** copy of the application and associated attachments, signed by all PIs and advisor (if appropriate).

Submission Addresses:
Mail to:
IRB/University Research Compliance
Oklahoma State University
219 Cordell North
Stillwater, OK 74078-1038
Hand deliver to:
IRB/University Research Compliance
208 or 217 Cordell North

Email Submission (Application must be signed):
irb@okstate.edu

For assistance, please contact the IRB staff in the Office of University Research Compliance at 405-744-3377 or email irb@okstate.edu.

Student Recruitment Email

Added only to follow up emails:

Last week/two weeks ago/etc.] an email was sent to you inviting you to participate in a research study. This follow-up *email* is being sent to remind you to *complete the survey* if you would like to participate and have not already done so. The deadline for participation is *[date].*

Student Recruitment Email

Subject Line: Participants being sought for an online learner research study

Hello TCC student,

As a graduate student at Oklahoma State University College of Education, I am recruiting participants for a research study about characteristics of students who complete online courses at Tulsa Community College.

Okla. State Univ. IRB
Approved 2-4-15
Expires 2-3-18
IRB # ED15-11

I am looking for people 18 years of age and older who are currently taking online classes at Tulsa Community College who are willing to participate in this VOLUNTARY study about online learner characteristics to advance the body of knowledge about online learning. This research study will take 25 minutes or less of your time and is conducted completely online.

If you choose to participate, I ask that you try to answer all questions. However, if there are any items that make you uncomfortable or that you would prefer to skip, please leave the answer blank.

The purpose of this research study is to examine certain characteristics of TCC online students who complete the Test of Online Learning Success (ToOLS) and how those characteristics might relate to final grades in online course(s). Results of this research study may add to the current body of knowledge about online learning and may influence curriculum developers for future online courses. It may also help you think about skills needed to be successful in online classes.

There are no known risks associated with participation in this research beyond those experienced in everyday living.

Any information that you provide in connection with this study and that can be identified with you will remain completely confidential and will be disclosed only with your permission or as required by law. Participant identities will be kept confidential. All data collected will be accessed only by me as the researcher, and will be kept by me personally under locked security. Any presentations or reports will represent groups and not individual participants. Please be assured that your participation, or non-participation, will have no effect on your grade in your online course.

If you do not wish to participate, you may simply not complete the survey, with no penalty to yourself. If you do participate, **completion and return of the survey indicates your consent to the above conditions and gives me your permission to include your responses in my data analysis.**

And if you have any questions about this study, please contact Ephanie DeBey at ephanie@okstate.edu or my OSU faculty advisor, Dr. Lynna Ausburn at lynna.ausburn@okstate.edu.

If you have questions about your rights as a research participant, you may contact the Oklahoma State University Institutional Review Board (IRB), which is concerned with the protection of volunteers in research projects. You may reach the board office by calling (405) 744-3377 or by writing: Institutional Review Board, **223 Scott Hall,** Stillwater, OK 74078. You may also email at irb@okstate.edu.

Thank you!

Information Email to Faculty, Associate Deans and the Distance Learning Committee

To: All Online Faculty, their Associate Deans, and the Distance Learning Committee

From: Ephanie DeBey

Subject: FYI: Student Research Participation Invitation for Online Classes

You're receiving this email because you either teach online classes at Tulsa Community College during the Spring 2015 semester or classes within your division were selected to receive an online research survey.

As we all know, the success rate in online classes is often lower than their traditional classroom counterparts. As more and more classes are offered online, we need to find a way to increase the success rate of our students. One way would be to help identify at risk students and the skills needed to succeed in an online class format. This research could help identify the learner readiness factors needed for student success in online classes and possibly identify subsets of at-risk students. With this research information, Tulsa Community College could help identify at risk students in our online classes, offer resources for areas of deficiency and/or help students be placed in more appropriate class formats.

This research is being conducted in the form of a confidential, online survey. At the beginning of all online courses, 8 weeks in duration or longer, an email with the survey information will be sent to your students. The survey focuses on online learner readiness factors and more specifically the Test of Online Learning Success (ToOLS) instrument in a two year setting. To do this, the online survey includes the ToOLS instrument and demographic questions. The ToOLS instrument is currently available as a resource for all online faculty and online students on the Tulsa Community College website as part of the Blackboard Student Orientation.

Please encourage students to complete the survey. The survey will take students approximately 25 minutes or less to complete. All responses and information from the survey will be kept confidential. There will be no reports and/or presentations generated on or about student completion rates, course type affiliations, or individual student responses. All reports and presentations will contain generalized student group information. As the researcher, I will be personally responsible for the confidential maintenance of all collected data and will maintain the data under locked security. All research will be conducted with the approval of the Oklahoma State University IRB and permission of Tulsa Community College. If you or your students have questions on the survey, please contact Ephanie DeBey at (918) 595-7743 or via email at ephanie@okstate.edu or my OSU faculty advisor, Dr. Lynna Ausburn at lynna.ausburn@okstate.edu.

Information on the consent process, directions, completion time and research contact information will also be included in the email the students receive.

following addresses and phone numbers: Ephanie DeBey, graduate student at Oklahoma State University College of Education via email at ephanie@okstate.edu or by phone at (918) 595-7743. You may also contact Lynna Ausburn, Ph.D. - Dissertation Advisor, College of Education Oklahoma State University, Stillwater, OK 74078 via email at lynna.ausburn@okstate.edu or by phone at (918) 243-5453. If you have questions about your rights as a research volunteer, you may contact the IRB Office at **223 Scott Hall**, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu.

Please print a copy of this consent form for your records, if you so desire.

By clicking the submit button to enter the survey, you are indicating that you have read and understood this consent information. You also indicate your willingness to voluntarily take part in the study. You give your permission for the researcher to include the information you provide in her data analysis.

To decline participation, simply close your browser now.

To participate, click on SUBMIT and proceed to the survey. Thank you for your participation.

APPENDIX 4

Survey Sent to Students

Q1.1 An Analysis of the ToOLS Online Readiness Instrument as an Indicator of Student Success in Online Courses in a Community College Environment

You are invited to participate in a research study on the Test of Online Learning Success (ToOLS) instrument measuring Online Learner Readiness. This study is conducted by Ephanie DeBey, a graduate student, from Oklahoma State University College of Education.

This study will examine the ToOLS Instrument as an indicator of success in online courses at Tulsa Community College. This survey will take approximately 25 minutes or less of your time. For this study, you will be asked to complete an online survey about your computer skills, academic skills, learning preferences and your need for online courses. You will also be asked a few demographic questions to help identify further subsets. Your participation in this research may benefit you personally by helping you identify areas of weaknesses needed to succeed in online courses. This study will also help us better understand indicators for success in online classes which may benefit future students and Tulsa Community College. There are no risks to individuals participating in this survey beyond those that exist in daily life. Your decision to participate or decline participation in this study is completely voluntary. I ask that you try to answer all questions; however, if there are any items that make you uncomfortable or that you would prefer to skip, please leave the answer blank. You have the right to terminate your participation at any time without penalty. If you want do not wish to complete this survey just close your browser.

The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored on a password protected drive in a locked box at the house of the primary investigator and only the researcher will have access to the records. If you provide information such as your College Wide ID number, your survey responses will no longer be anonymous to the researcher. However, no names or identifying information would be included in any publications or presentations based on this data, and your responses to this survey will remain confidential. Your participation in this research will be completely confidential and data will be averaged and reported in aggregate.
If you have questions about this project, You may contact the researcher or her advisor at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Ephanie DeBey, graduate student at Oklahoma State University College of Education via email at ephanie@okstate.edu or by phone at (918) 595-7743. You may also contact Lynna Ausburn, Ph.D. - Dissertation Advisor, College of Education Oklahoma State University, Stillwater, OK 74078 via email at lynna.ausburn@okstate.edu or by phone at (405) 744-8322. If you have questions about your rights as a research volunteer, you may

contact the IRB Office at 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

Please print a copy of this consent form for your records, if you so desire.
I have read and understand the above consent form. By clicking the submit button to enter the survey, I indicate my willingness to voluntarily take part in the study.

Q1.4 I certify that I'm at least 18 years of age or older at the time of this survey.
- ❍ Yes (1)
- ❍ No (2)

Q1.5 I have never before taken the Test of Online Learning Success (ToOLS).
- ❍ Yes (1)
- ❍ No (2)

Q1.3 I also give my permission to collect my grade(s) for my online courses at the end of the Spring 2015 semester.
- ❑ My College Wide ID (CWID) starting with a T is: (1) _____
- ❑ I do not give permission at this time. (2)

Q2.1 What is your gender?
- ❍ Male (1)
- ❍ Female (2)

Q2.2 What is your age at the time of this survey?

Q2.3 What is your race/ethnicity?
- ❍ American Indian or Alaska Native (1)
- ❍ Asian (2)
- ❍ Black or African American (3)
- ❍ Hispanic of any Race (4)
- ❍ More than one race reported (5)
- ❍ Native Hawaiian or Other Pacific Islander (6)
- ❍ White (7)
- ❍ Not Reported (8)

Q2.4 Your relationship status could be described as
- ❍ Married (1)
- ❍ Single (2)
- ❍ Divorced (3)
- ❍ Widowed (4)

Q2.5 What is your current student status for the Spring 2015 semester?
- ❍ Full Time Student (enrolled in 12 or more credit hours) (1)
- ❍ Part Time Student (enrolled in 11 or less credit hours) (2)

Q2.6 Did you place into any developmental courses including Reading, Writing, or Mathematics?
- ❍ Yes (1)
- ❍ No (2)

Q2.8 The number of online courses you are currently enrolled in for the Spring 2015 semester is
- ❍ 1 Online Class (1)
- ❍ 2 - 3 Online Classes (2)
- ❍ 4+ Online Classes (3)

Q2.7 The number of online courses you have completed prior to the Spring 2015 semester is
- ❍ None (1)
- ❍ 1 - 2 Online Classes (2)
- ❍ 3 - 5 Online Classes (3)
- ❍ 5 - 8 Online Classes (4)
- ❍ More than 8 Online Classes (5)

Q2.9 Approximately how many hours do you work each week?
- ❍ I currently don't work. (1)
- ❍ 0 - 10 Hours (2)
- ❍ 11 - 20 Hours (3)
- ❍ 21 - 30 Hours (4)
- ❍ 31 - 40 Hours (5)
- ❍ Over 40 Hours (6)

Q3.1 Directions: The following items measure your ability to perform different tasks. There are no right or wrong answer so your first reaction is usually best. Please do not omit any items. If an item does not relate to you, rate it as 0 (not applicable). Your efforts will help us to identify tasks that are most important for student success. Using the following scale, rate how well each item describes you, by clicking the box of your response to the right of each item.

	Not Applicable (1)	Strongly Disagree (2)	Disagree (3)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
I am capable of learning new technologies. (1)	❍	❍	❍	❍	❍	❍
I am capable of sending and receiving e-mail. (2)	❍	❍	❍	❍	❍	❍
I am capable of attaching files to an e-mail message. (3)	❍	❍	❍	❍	❍	❍
I am a competent Internet browser. (4)	❍	❍	❍	❍	❍	❍
I am capable of using standard word processing software. (5)	❍	❍	❍	❍	❍	❍
I am capable of managing files on a computer. (6)	❍	❍	❍	❍	❍	❍
I can download new software when necessary. (7)	❍	❍	❍	❍	❍	❍

I can install new software when necessary. (8)	❍	❍	❍	❍	❍	❍
I can copy and paste text using a computer. (9)	❍	❍	❍	❍	❍	❍
I am capable of using discussion boards online. (10)	❍	❍	❍	❍	❍	❍
I am capable of using chat rooms online. (11)	❍	❍	❍	❍	❍	❍

Q4.1 Directions: The following items measure your ability to perform different tasks. There are no right or wrong answer so your first reaction is usually best. Please do not omit any items. If an item does not relate to you, rate it as 0 (not applicable). Your efforts will help us to identify tasks that are most important for student success. Using the following scale, rate how well each item describes you, by clicking the box of your response to the right of each item.

	Not Applicable (1)	Strongly Disagree (2)	Disagree (3)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
I am capable of prioritizing my responsibilities. (1)	❍	❍	❍	❍	❍	❍
I am a good time manager. (2)	❍	❍	❍	❍	❍	❍
I am a procrastinator. (3)	❍	❍	❍	❍	❍	❍
I am capable of making time for my coursework. (4)	❍	❍	❍	❍	❍	❍
I am able to balance many tasks at one time. (5)	❍	❍	❍	❍	❍	❍
I am goal-oriented. (6)	❍	❍	❍	❍	❍	❍
I am self-disciplined when it comes to my studies. (7)	❍	❍	❍	❍	❍	❍
I am self-motivated. (8)	❍	❍	❍	❍	❍	❍
I take responsibility for my learning. (9)	❍	❍	❍	❍	❍	❍
I am capable of critical thinking. (10)	❍	❍	❍	❍	❍	❍

Q5.1 Directions: The following items measure your ability to perform different tasks. There are no right or wrong answer so your first reaction is usually best. Please do not omit any items. If an item does not relate to you, rate it as 0 (not applicable). Your efforts will help us to identify tasks that are most important for student success. Using the following scale, rate how well each item describes you, by clicking the box of your response to the right of each item.

	Not Applicable (1)	Strongly Disagree (2)	Disagree (3)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
I often leave tasks unfinished. (1)	❍	❍	❍	❍	❍	❍
I require help to understand written instructions. (2)	❍	❍	❍	❍	❍	❍
I wait until the last minute to work on assignments. (3)	❍	❍	❍	❍	❍	❍
I have trouble comprehending what I read. (4)	❍	❍	❍	❍	❍	❍
I need faculty to remind me of assignment due dates. (5)	❍	❍	❍	❍	❍	❍
I need incentives/rewards to motivate me to complete a task. (6)	❍	❍	❍	❍	❍	❍

Q6.1 Directions: The following items measure your ability to perform different tasks. There are no right or wrong answer so your first reaction is usually best. Please do not omit any items. If an item does not relate to you, rate it as 0 (not applicable). Your efforts will help us to identify tasks that are most important for student success. Using the

following scale, rate how well each item describes you, by clicking the box of your response to the right of each item.

	Not Applicable (1)	Strongly Disagree (2)	Disagree (3)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
Because of my personal schedule, I need online courses. (1)	❍	❍	❍	❍	❍	❍
It is difficult for me to go to campus to complete course requirements. (2)	❍	❍	❍	❍	❍	❍
I need online courses because of my geographical distance from universities. (3)	❍	❍	❍	❍	❍	❍
I need online courses because of my work schedule. (4)	❍	❍	❍	❍	❍	❍
I need the freedom of completing coursework at the time and place of my choosing. (5)	❍	❍	❍	❍	❍	❍

Q7.1 Directions: The following items measure your ability to perform different tasks. There are no right or wrong answer so your first reaction is usually best. Please do not omit any items. If an item does not relate to you, rate it as 0 (not applicable). Your efforts will help us to identify tasks that are most important for student success. Using the following scale, rate how well each item describes you, by clicking the box of your response to the right of each item.

	Not Applicable (1)	Strongly Disagree (2)	Disagree (3)	Neither Agree nor Disagree (4)	Agree (5)	Strongly Agree (6)
I can learn by working independently. (1)	❍	❍	❍	❍	❍	❍
I am self-directed in my learning. (2)	❍	❍	❍	❍	❍	❍
I am capable of solving problems alone. (3)	❍	❍	❍	❍	❍	❍
I need face-to-face interaction to learn. (4)	❍	❍	❍	❍	❍	❍
I need faculty feedback on my completed assignments. (5)	❍	❍	❍	❍	❍	❍
I am a good reader. (6)	❍	❍	❍	❍	❍	❍
I need classroom discussion to learn. (7)	❍	❍	❍	❍	❍	❍
I am capable of asking for help when I have a problem. (8)	❍	❍	❍	❍	❍	❍
I am comfortable learning new skills. (9)	❍	❍	❍	❍	❍	❍
I read carefully. (10)	❍	❍	❍	❍	❍	❍

I am a good writer. (11)	❍	❍	❍	❍	❍	❍
I am capable of following written instructions. (12)	❍	❍	❍	❍	❍	❍
I am capable of conveying my ideas in writing. (13)	❍	❍	❍	❍	❍	❍

Q8.1 Thank you for your time and effort. If you have any questions concerning this survey or its results, please contact the researcher at ephanie@okstate.edu. Best of luck in your online course(s)!

APPENDIX 5

Informational Email to Administration

Information Email to Faculty, Associate Deans and the Distance Learning Committee

To: All Online Faculty, their Associate Deans, and the Distance Learning Committee

From: Ephanie DeBey

Subject: FYI: Student Research Participation Invitation for Online Classes

You're receiving this email because you either teach online classes at Tulsa Community College during the Spring 2015 semester or classes within your division were selected to receive an online research survey.

As we all know, the success rate in online classes is often lower than their traditional classroom counterparts. As more and more classes are offered online, we need to find a way to increase the success rate of our students. One way would be to help identify at risk students and the skills needed to succeed in an online class format. This research could help identify the learner readiness factors needed for student success in online classes and possibly identify subsets of at-risk students. With this research information, Tulsa Community College could help identify at risk students in our online classes, offer resources for areas of deficiency and/or help students be placed in more appropriate class formats.

This research is being conducted in the form of a confidential, online survey. At the beginning of all online courses, 8 weeks in duration or longer, an email with the survey information will be sent to your students. The survey focuses on online learner readiness factors and more specifically the Test of Online Learning Success (ToOLS) instrument in a two year setting. To do this, the online survey includes the ToOLS instrument and demographic questions. The ToOLS instrument is currently available as a resource for all online faculty and online students on the Tulsa Community College website as part of the Blackboard Student Orientation.

Please encourage students to complete the survey. The survey will take students approximately 25 minutes or less to complete. All responses and information from the survey will be kept confidential. There will be no reports and/or presentations generated on or about student completion rates, course type affliations, or individual student responses. All reports and presentations will contain generalized student group information. As the researcher, I will be personally responsible for the confidential maintenance of all collected data and will maintain the data under locked security.

All research will be conducted with the approval of the Oklahoma State University IRB and permission of Tulsa Community College. If you or your students have questions on the survey, they may contact me, Ephanie DeBey, via email at ephanie.debey@tulsacc.edu or by phone at 918-595-7743.

Information on the consent process, directions, completion time and research contact information will also be included in the email the students receive.

APPENDIX 6

Introduction Letter/Recruitment Letter Email to Students

Student Recruitment Email

Added only to follow up emails:

Last week/two weeks ago/etc.] a*n email* was sent to you inviting you to participate in a research study. This follow-up *email* is being sent to remind you to *complete the survey* if you would like to participate and have not already done so. The deadline for participation is *[date]*.

Sample Recruitment Email

Subject Line: Participants being sought for an online learner research study

Hello TCC student,

As a graduate student at Oklahoma State University College of Education, I am recruiting participants for a research study about characteristics of students who complete online courses at Tulsa Community College.

The purpose of this research study is to examine certain characteristics of TCC online students who complete the Test of Online Learning Success (ToOLS) and how those characteristics might relate to final grades in online course(s). Results of this research study may add to the current body of knowledge about online learning and may influence curriculum developers for future online courses. It may also help you think about skills needed to be successful in online classes.

There are no known risks associated with participation in this research beyond those experienced in everyday living.

I am looking for people 18 years of age and older who are currently taking online classes at Tulsa Community College who are willing to participate in this VOLUNTARY study about online learner characteristics to advance the body of knowledge about online learning. This research study will take 25 minutes or less of your time and is conducted completely online.

If you choose to participate, I ask that you try to answer all questions. However, if there are any items that make you uncomfortable or that you would prefer to skip, please leave the answer blank.

Any information that you provide in connection with this study and that can be identified with you will remain completely confidential and will be disclosed only with your permission or as required by law. Participant identities will be kept confidential. All data collected will be accessed only by me as the researcher, and will be kept by me personally under locked security. Any presentations or reports will represent groups and not individual participants. Please be assured that your participation, or non-participation, will have no effect on your grade in your online course.

If you do not wish to participate, you may simply not complete the survey, with no penalty to yourself. If you do participate, **completion and return of the survey indicates your consent to the above conditions and gives me your permission to include your responses in my data analysis. Please note that I cannot remove your data from analysis once you submit your questionnaire.**

And if you have any questions about this study, please contact Ephanie DeBey at ephanie@okstate.edu or my OSU faculty advisor, Dr. Lynna Ausburn at lynna.ausburn@okstate.edu.

If you have questions about your rights as a research participant, you may contact the Oklahoma State University Institutional Review Board (IRB), which is concerned with the protection of volunteers in research projects. You may reach the board office by calling (405) 744-3377 or by writing: Institutional Review Board, 219 Cordell North, Stillwater, OK 74078. You may also email at irb@okstate.edu.
Thank you

APPENDIX 7

The Test of Online Learning Success (ToOLS) Questions

Computer Skills

1. I am capable of learning new technologies
2. I am capable of sending and receiving email.
3. I am capable of attaching files to an e-mail message.
4. I am competent Internet browser.
5. I am capable of using standard word processing software.
6. I am capable of managing files on a computer.
7. I can download new software when necessary.
8. I can install new software when necessary.
9. I can copy and paste text using a computer.
10. I am capable of using discussion boards online.
11. I am capable of using chat rooms online.

Independent Learning Skills

12. I am capable of prioritizing my responsibilities.
13. I am a good time manager.
14. I am a procrastinator.
15. I am capable of making time for my coursework.
16. I am able to balance many tasks at one time.
17. I am goal-oriented.
18. I am self-disciplined when it comes to my studies.
19. I am self-motivated.
20. I take responsibility for my learning.
21. I am capable of critical thinking.

Dependent Learning Skills

22. I often leave tasks unfinished.
23. I require help to understand written instructions.
24. I wait until the last minute to work on assignments.
25. I have trouble comprehending what I read.
26. I need faculty to remind me of assignment due dates.
27. I need incentives/rewards to motivate me to complete a task.

Need for Online Delivery

28. Because of my personal schedule, I need online courses.
29. It is difficult for me to go to campus to complete course requirements.
30. I need online courses because of my geographical distance from universitites.
31. I need online courses because of my work schedule.
32. I need the freedom of completing coursework at a time and place of my choosing.
33. I can learn by working independently.

Academic Skills

34. I am self-directed in my learning.
35. I am capable of solving problems alone.
36. I need face to face interaction to learn.
37. I need faculty feedback on my completed assignments.
38. I am a good reader.
39. I need classroom discussion to learn.
40. I am capable of asking for help when I have a problem.
41. I am comfortable learning new skills.
42. I read carefully.
43. I am a good writer.
44. I am capable of following written instructions.
45. I am capable of conveying my ideas in writing.

APPENDIX 8

The Test of Online Learning Success (ToOLS) Scoring Instructions

Test of Online Learning Success (ToOLS)

Administration Guidelines and Scoring Procedures

Guidelines for Use

Researchers do not need permission from the authors to use ToOLS for data collection.

To ensure that the newest version of ToOLS is used, researchers should contact Dr. Marcel Kerr at mskerr@txwes.edu

If ToOLS is used, the authors would appreciate notification and a brief description of how ToOLS will be used.

If ToOLS or any part of it are used, submitted for publication, and/or published in any manner, the authors must be cited/acknowledged.

If ToOLS is used, the authors would appreciate receiving a summary of findings.

Scoring Procedures

RESEARCHERS

ToOLS consists of 45 items, which comprise five subscales:

Computer Skills (1 – 11)
Independent learning (12 – 21)
Dependent Learning (22- 27)
Need for Online Delivery (28 – 32)
Academic Skills (33 – 45)

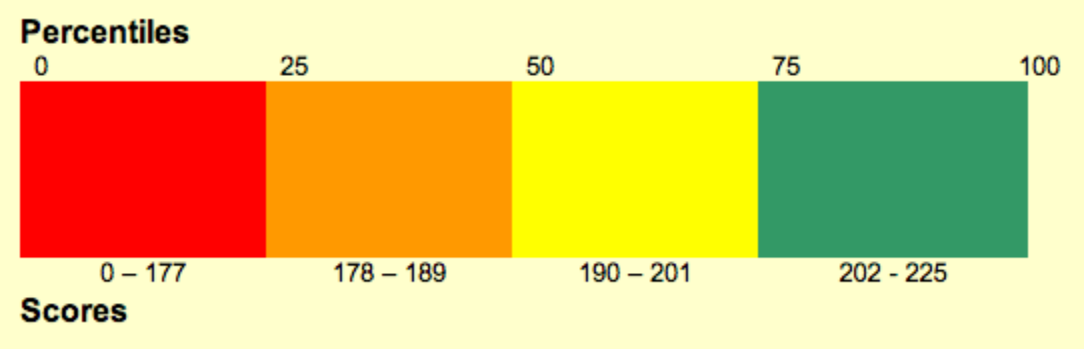
Higher scores reflect higher skills. Thus lower scores on Dependent Learning denote *more* dependence (less independence).

The following nine items are reverse scored: 14, 22, 23, 24, 25, 26, 27, 36, and 37. The five subscales are created by computing means across the respective subscale items. Total online learning success (OLS) is calculated by summing across all 45 items.

STUDENT PROFILES

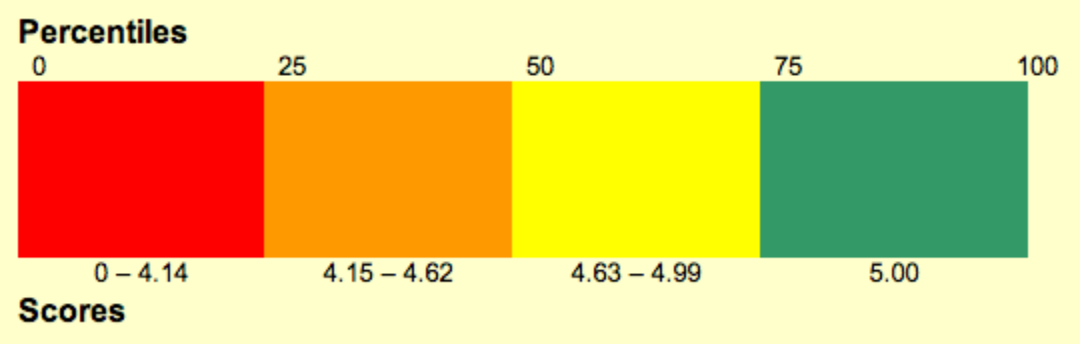
In order to calculate your overall learning success (OLS), simply reverse score the nine items mentioned above, and sum across all 45 items to obtain your OLS score. Then compare your OLS to others who have completed ToOLS using the table below. Use the color code at the bottom of this page to read a description of your OLS score range.

Total Online Learning Success (OLS)

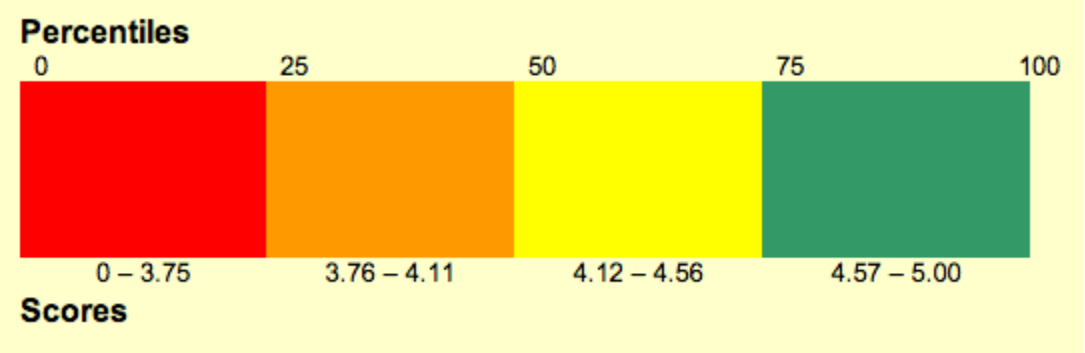


To obtain your individual student profile, you must calculate your subscale scores. To calculate subscale scores, again reverse score the nine items above; then calculate a mean (average) across the items associated with each scale (e.g., Computer Skills includes items 1 – 11). Then compare your subscale scores to others who have completed ToOLS using the respective tables below. Use the color code at the bottom of this page to read a description of your identified skill level for each subscale.

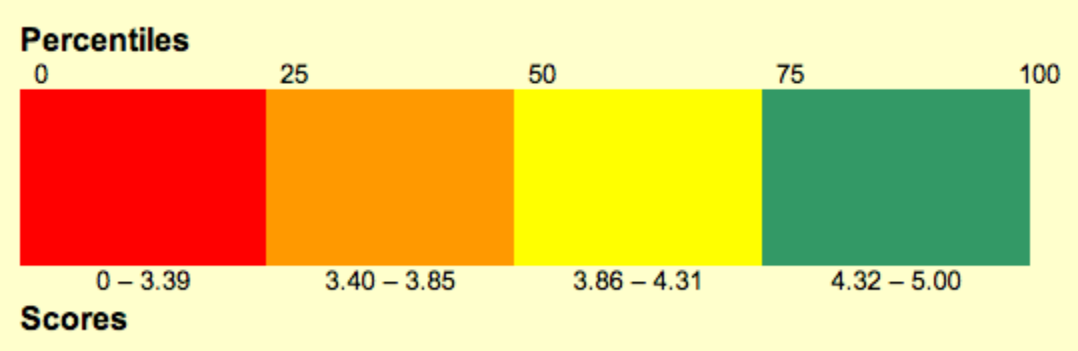
Computer Skills



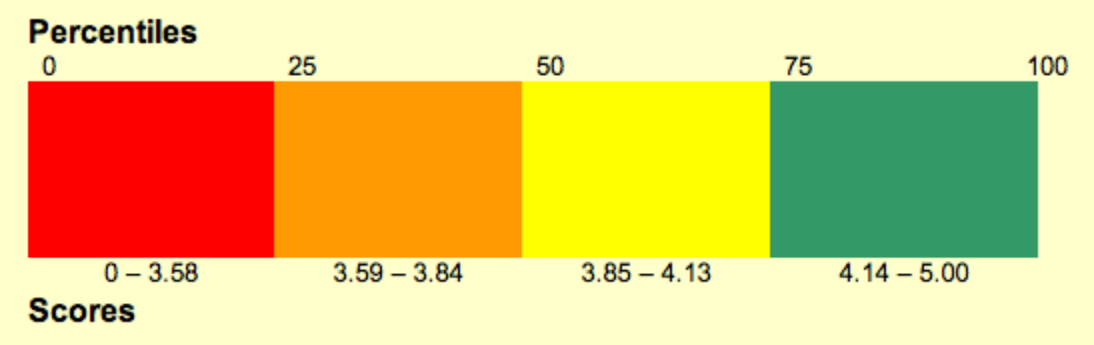
Independent Learning



Dependent Learning



Academic Skills



Need for Online Delivery

Unlike the other subscales, this series of items identifies a need instead of a skill. If your Need for Online Learning mean (average) is 3.40 or higher, it indicates that your lifestyle (i.e., career, family structure, personal responsibilities, distance to higher education entities) may demand the flexibility and scheduling that the online classroom can provide. Scores below 3.40 suggest that you do not have a pressing need for online delivery of instruction at this time.

Individuals who score between 202 and 225 on OLS and/or in the green zone on any given subscale are more than prepared for online learning. Scores in these ranges indicate that the individual possesses the necessary personality traits, motivation, computer skills, and academic skills that predict successful achievement in the online classroom.

READY TO GO

An OLS score between 190 and 201 indicates that the individual is in the top half (50^{th} percentile) of learners. Individuals with an OLS score in this range are more prepared for online learning than 50-75 percent of their student peers. In order to increase one's performance in the online class, she should examine her four subscale scores and Need for Online Delivery. If any subscale scores fall in the yellow, orange, or red zones, the individual should read up on the identified skills.

TAKE SOME NOTES

Individuals who score between 178 and 189 on OLS and/or in the orange zone on any subscale are encouraged to seek additional information and assistance. OLS scores in this range indicate that the individual falls in the lower half (50^{th} percentile) of learners. Orange zone skills suggest that the individual lacks a few skills that have been identified as predictors of online achievement. To increase one's skills in a subscale, the individual should review the requirements of online courses carefully prior to enrollment. The individual also should review the university's policies and minimum skill requirements often posted on their webpage. Additionally, the individual should review the online links below for additional information and consult with the distance education staff or instructors of the course/program either via e-mail or phone. Once taken, these steps will allow the learner to make an informed and confident decision regarding online course or program enrollment.

PROCEED WITH CAUTION

Obtaining an OLS score between 0 and 177 suggests that the individual needs to acquire additional skills in order to succeed in the online environment. Similarly, subscale scores that fall in the red zones indicate skill deficits. These students are encouraged to enroll in face-to-face courses/programs as the online classroom may not fit one's learning preferences and skills. However, if the individual has an identified Need for Online Delivery (i.e., score above 3.40), then the following steps are suggested. In order to increase one's chances of success online, 1) the individual should complete all recommendations described under the, *Proceed with Caution* section above. 2) The individual should access and complete the tutorials below that meet the respective deficit skill set. 3) If a Computer Skills deficiency is identified, completion of a basic computer applications course is recommended. 4) If an Academic Skills deficiency is identified, completion of an introductory English (composition and rhetoric) course is recommended), and 5) if the individual is identified as a dependent learner, one should consider using the following strategies once enrolled in an online course:

- Keep an electronic calendar of assignment due dates that sends audible reminders (alarms),
- Establish rapport with a classmate quickly and obtain her feedback on assignments prior to submitting them for grading, and
- Discuss the deficit area with the course instructor early to determine how impactful sh/e feels it will be given the course requirements.

Links to Online Tutorials

- Study Skills Self-help Information, *Virginia Tech University, Division of Student Affairs* *http://www.ucc.vt.edu/stdysk/stdyhlp.html*
- Keller, C. A., Strategies for Success: For Online Learners, *Alamo Community College District* *http://www.accd.edu/sac/history/keller/accdit/SSOindex.htm*
- Web 3 Schools – free tutorials http://www.w3schools.com/
- Learn2: Online Tutorials http://www.tutorials.com/

Dr. Marcel S. Kerr, mskerr@txwes.edu

As adapted from *http://www.txwescetl.com/test-of-online-learning-success-tools/*

VITA

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Candidate for the Degree of

Doctor of Philosophy

Thesis: AN ANALYSIS OF THE ToOLS ONLINE READINESS INSTRUMENT AS AN INDICATOR OF STUDENT SUCCESS IN ONLINE COURSES IN A COMMUNITY COLLEGE ENVIRONMENT

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Biographical:

Education:

Completed the requirements for the Doctor of Philosophy/Education in Education at Oklahoma State University, Stillwater, Oklahoma in May, 2016.

Completed the requirements for the Master of Business Administration at Oklahoma State University, Stillwater, Oklahoma in May, 2005.

Completed the requirements for the Bachelor of Arts in Biology at Southwestern College, Winfield, Kansas in 2000.

Experience:

Tulsa Community College: Academic Division Administrator
Science and Mathematics Division
August 2012 – Present

Tulsa Community College: Adjunct Faculty
Science, Business, & Liberal Arts
January 2006 – Present

Tulsa Community College: Student Activities Specialist
Student Activities
October 2000 – August 2012

Professional Memberships:

Association for Career and Technical Education Research (ACTER)
College Student Educators International (ACPA)
Oklahoma College Student Personnel Association