STUDY OF THE PREDICTIVE VALUE OF THE TEST OF ONLINE LEARNING SUCCESS

A Dissertation submitted to the faculty of
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Doctor of Education

In

Educational Leadership

by
David Edward Lee
San Francisco, California
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CERTIFICATION OF APPROVAL

I certify that I have read *Study of the Predictive Value of the Test of Online Learning Success* by David Edward Lee, and that in my opinion this work meets the criteria for approving a dissertation submitted in partial fulfillment of the requirement for the degree Doctor of Education in Educational Leadership at San Francisco State University.

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The growth and popularity of undergraduate asynchronous online courses within the California State University (CSU) system including at San Francisco State University (SF State) has provided students with more opportunities for learning. However, research has shown that asynchronous online courses do not work equally well for all students and have resulted in impacts in course retention and failure rates. SF State and the CSU have turned to measures than can improve student performance and persistence in asynchronous online courses.

One of the measures universities have adopted is to offer students online readiness assessments that can provide information about students' preparation for taking an online course. The CSU recently turned to online readiness assessment instruments to address problems with student failure and dropout in online courses. One of the available assessments that had been published in the public domain and validated as able to predict student success is the Test of Online Learning Success (ToOLS). SF State did not have or use an online readiness assessment. This study was designed to evaluate if ToOLS was a viable assessment for SF State.

Five undergraduate asynchronous online courses provided a sample (N=166) of students who took a pre-survey, the ToOLS assessment, and a post-survey to address the question of whether ToOLS could predict student success in asynchronous online courses, and to evaluate students' attitudes and perceptions about the ToOLS assessment. This research established that ToOLS was not able to predict student success at SF State. It did reveal that ToOLS could help impacted student groups better prepare for their online experience and raised students' awareness of helpful behaviors for improving their chances of success in their online courses.

I certify that the Abstract is a correct representation of the content of this dissertation.

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INTRODUCTION

The Evolution of Online Education

The growth and rise in popularity of undergraduate asynchronous online courses nationally, within the California State University (CSU) system and particularly at San Francisco State University (SF State) has increased demands for additional student supports for online students (Ludwig-Hardman & Dunlap, 2003). According to Allen and Seaman (2013), online education nationally has expanded rapidly in the last decade. In 2011, over 6.7 million students were taking at least one online course. The increase from 1.6 million students in fall 2002 to the 6.7 million in fall 2011 represents a compound annual growth rate of 17.3%. By comparison, the overall higher education student body has grown at an annual rate of 2.6% during this same period—from 16.6 million in fall 2002 to 21.0 million in fall 2011 (Allen & Seaman, 2013). Nearly half of all college students have taken at least one online course (Means, Bakia, & Murphy, 2014). As Figure 1 below illustrates, online enrollment in degree-granting higher education institutions continues to climb (Allen & Seaman, 2013).

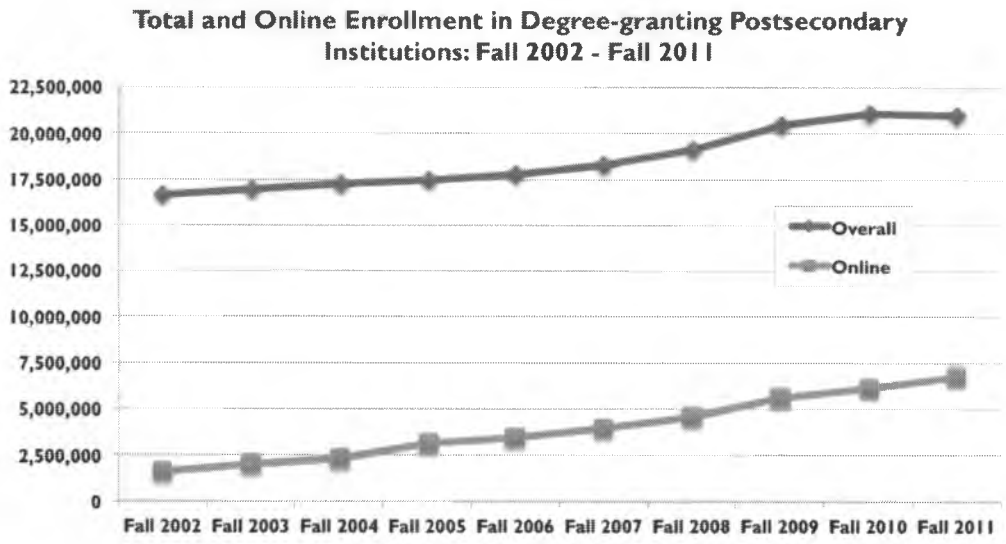

Figure 1. Total and Online Enrollment in degree-granting Postsecondary Institutions: Fall 2002-Fall 2011 (Allen & Seaman, 2013, p. 18).

The CSU Promotes Online Courses

In 2013, after facing years of budget cuts to the CSU, California Governor Jerry Brown launched an unprecedented effort to increase the number of online courses offered by the CSU. Governor Brown embarked upon online education expansion as his central strategy for delivering higher education opportunities to more students without the added costs of providing more instructors, classrooms, and dormitories, particularly in a state still struggling with debt. Governor Brown set aside $11 million in his 2013-2014 budget to expand the number of online courses in the CSU. The California State Legislature and the CSU Board of Trustees reacted by amending policies to allow for easier creation of online courses and to earmark funds to move high demand undergraduate courses required for graduation to online (Means et al., 2014).

CSU launched CSU Fully Online (then known as Course Match) in 2013. This provided an opportunity for eligible matriculated students to enroll in one course per term offered by another CSU campus (Rivera, 2013). The program was designed to expand access to high-demand, high-success courses as part of CSU's effort of providing students with access to the courses needed to expedite graduation. In 2016, the CSU Fully Online program offered asynchronous online courses from each of the 23 system campuses in a variety of disciplines to accommodate the needs of current CSU students. Courses offered in the program encompassed all online courses including the CSU's CourseMatch online courses. CourseMatch courses have undergone an extensive review process and been deemed effective based on their curriculum and student success rates (California State University, n.d.).

The Appeal of Online Courses

The appeal of online education to both higher education policy makers and students continued to increase. Schiffman, Vignare, and Geith (2007) found that the two primary reasons why higher education institutions pursued online education was getting students from new geographic regions and accessing new markets of students. Students were attracted to online courses because of their scheduling flexibility and because they required less travel than traditional face-to-face courses (Means et al., 2014). However, with online courses came increased failure and drop-out rates (Rovai, 2003) compared to face-to-face courses (Willging & Johnson, 2009). The fact that costs and impacts were not evenly distributed (Jaggars, 2011; Kaupp, 2012) had to be considered as part of the

overall cost of providing online education.

The Rising Dominance of Asynchronous Courses

Asynchronous online courses have been an appealing choice because they do not require the instructor and the student to be online at the same time, and the student is expected to complete coursework on his or her own schedule. Asynchronous online courses have constituted over 80% of the online courses offered by SF State.

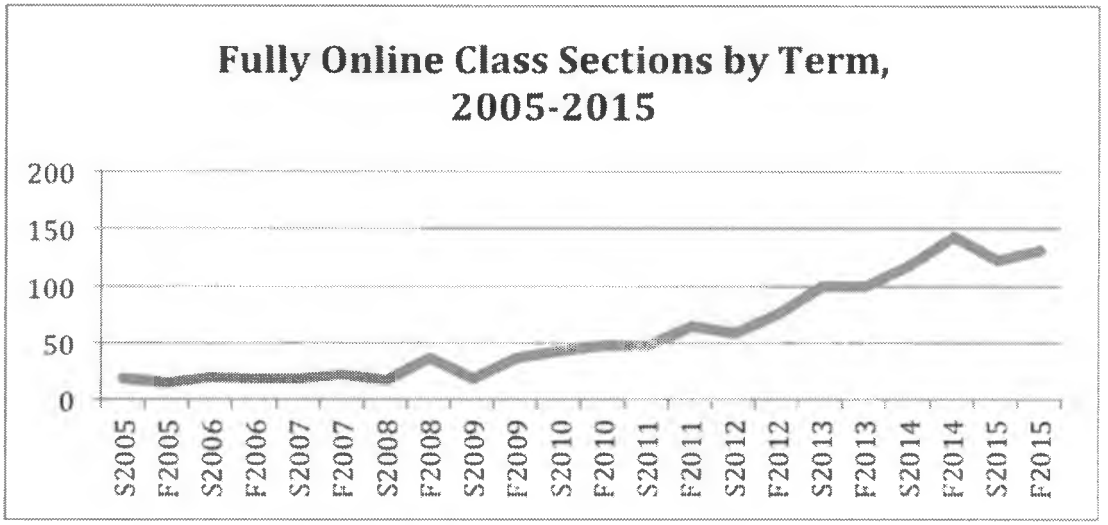

Figure 2. Fully online class sections by term, 2005-2015. See Table 1 for data.

SF State has not been immune to the appeal of online education as can be seen in Figure 2. Between 2005-2015, the number of fully online asynchronous course sections offered at SF State per semester grew from 19 in Spring 2005 to 131 in Fall 2015.

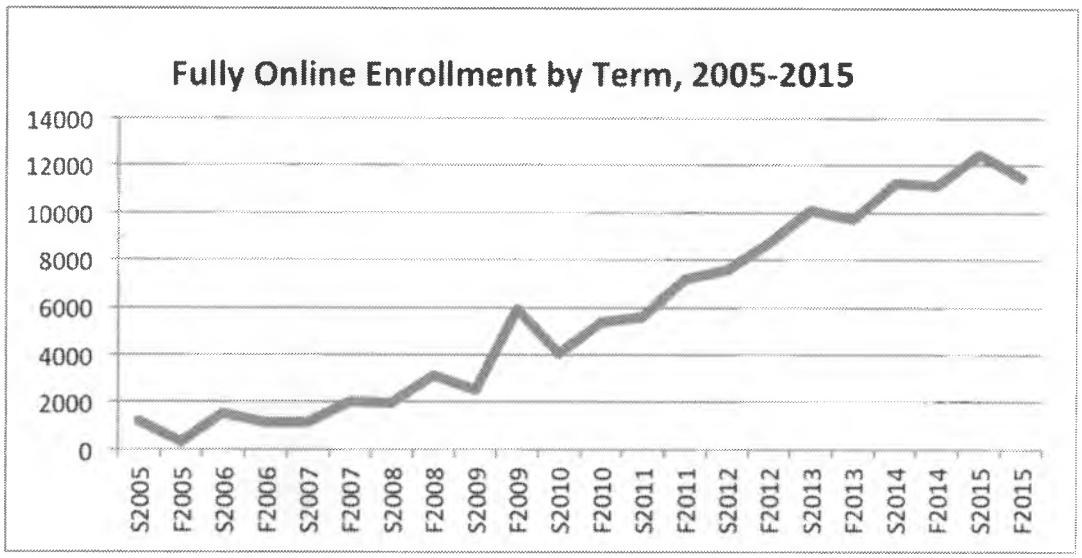

Figure 3. Fully online enrollment by term (2005-2015). See Table 1 for data table.

Moreover, student enrollment (see Figure 3) in asynchronous online courses per semester increased more than 8-fold from 1,213 to 11,461. In the last decade, there were 125,698 total enrollments in asynchronous online courses at SF State. There were 11, 474 students enrolled in online courses in fall 2015, and nearly all of those were asynchronous online courses: 130 out of 132 (98%). Similarly, in Spring 2016, 12,246 students were enrolled in online courses and nearly all of those courses were asynchronous as well: 149 out of 152 (98%). Most asynchronous courses were undergraduate courses. If the pattern of the last decade continues as shown in Table 1, the number of students enrolling in online classes may well continue to grow.

Table 1.

Ten-Year Growth of Online Enrollment for the Years 2005-2015

Term	Class Sections	Enrollment
S2005	19	1213
F2005	15	324
S2006	20	1561
F2006	18	1180
S2007	18	1137
F2007	22	2009
S2008	17	1953
F2008	37	3143
S2009	19	2523
F2009	37	5944
S2010	43	4061
F2010	48	5359
S2011	47	5607
F2011	65	7184
S2012	58	7603
F2012	75	8716
S2013	99	10125
F2013	100	9,718
S2014	118	11,252
F2014	143	11,150
S2015	122	12,475
F2015	131	11461
10YR-TOTAL	1271	125698

Note: S = spring, F= fall.

Rising Student Dropout and Failure Rates

Students in online courses were found to have completion rates between 20-50% lower than students in face-to-face courses (Gascoigne & Parnell, 2014). Many students were not able to adapt to the online format successfully and were failing at a higher rate (Allen & Seaman, 2013; Cochran, Campbell, Baker, & Leeds, 2014). Research has shown many contributing factors to online student failure rates (Morris & Finnegan, 2009; Morris, Wu, & Finnegan, 2005) including insufficient command of basic computer skills (Ludwig-Hardman & Dunlap, 2003), lack of strong reading and writing skills (Muilenburg & Berge, 2005), and an inability to work independently without the benefit of in-person, face-to-face instruction (Hart, 2012; Tyler-Smith, 2006). High student drop-out and failure rates in online undergraduate courses have been cited frequently in the literature as a persistent characteristic of online courses (Allen & Seaman, 2003; Jaggars, 2014; Means et al., 2014).

Equity Concerns

In a study of nearly 500,000 online courses taken by over 40,000 community and technical college students in the State of Washington, Xu and Jaggars (2014) found that African American students, males, and students with lower levels of academic preparation struggled more than their counterparts to adapt to the online environment in terms of ability to keep up with online course work and earn strong grades relative to their ability to do so in face-to-face courses.

Johnson and Mejia (2014) found that some students struggle with the high level of

autonomy and time management requirements of online education and that some students are not as comfortable and experienced with online learning as are others. More significantly, researchers such as Xu and Jaggars (2014) found that performance gaps between key demographic groups such as Black males or Latinos (Kaupp, 2012) and Whites that are already found in face-to-face classrooms are exacerbated in online courses. Xu and Jaggars (2014) concluded that their findings were "troubling from an equity perspective: If this pattern holds true across other states and educational sectors, it would imply that the continued expansion of online learning could strengthen, rather than ameliorate, educational inequity" (p. 23).

Addressing Increased Dropout and Failure Rates

Higher education institutions nationally, in the CSU and at SF State, have begun to address dropouts and failures in online courses, especially for those most affected in undergraduate courses. Campuses have used various means that include: more tutoring support for online learners, specialized courses to teach online learners how to use computers, and more hybrid courses that combine the online format with periodic in-person classroom instruction.

Development of Assessments for Online Readiness

Online readiness assessments have gained popularity in the last few years. These instruments are self-reported surveys that ask students to rate their attitudes and beliefs about online learning as well as their personal learning preferences; these surveys are used to calculate students' likelihood of success. They have been used by higher

education institutions to predict achievement in online courses and to counsel unprepared students to seek additional help to increase their likelihood of success (Alem, 2014; Dray, Lowenthal, Miszkiewicz, Ruiz-Primo, & Marczynski, 2011).

CSU now makes available online readiness assessments to help students' evaluate their chances of success in online courses before they enroll. In 2016, all CSU online students were able to access an instrument known as the Online Readiness Self-Assessment to evaluate their preparedness for online learning through a website hosted by the Chancellor (https://csrc.collegesource.com/view/csrc_assessment.aspx). Additionally, several of the 23 CSU campuses provided their online students with additional online readiness assessments or link to assessments. At least ten different online readiness assessment instruments were available in 2016 within the CSU. The assessments being used could be classified into three categories: homemade, published, and commercial. *Homemade* assessments were created by faculty or staff and were unpublished (Alem, et al 2014). *Published* assessments had been created by researchers, were published, and have had their assessment measures validated. *Commercial* assessment instruments were created by private vendors and might or might not have been validated. Table 2 illustrates the variety of assessments currently available in the CSU system. In 2016, all of these assessments were provided to CSU students free of charge in keeping with CSU's efforts to keep student costs to a minimum.

Table 2.

Online Readiness Assessments Used within the CSU in 2016.

Campus	Campus Hosted or Linked Assessment	Type
Bakersfield	CSU Bakersfield Online Readiness Quiz	Homemade
Channel Islands	Online Readiness Self-Assessment	Homemade
Chico	ToOLS	Published/Public
Dominguez Hills	Link to another institution	Homemade
East Bay	VARK learning inventory	Commercial
Fresno	Online Readiness Self-Assessment	Homemade
Fullerton	Online Readiness Self-Assessment	Homemade
Humboldt State University	Is online learning for me?	Homemade
Long Beach	Online Readiness Self-Assessment	Homemade
Los Angeles	Link to CSU Stanislaus assessment	Homemade
Maritime Academy	Online Readiness Self-Assessment	Homemade
Monterey Bay	Online Readiness Self-Assessment	Homemade
Northridge	Online Readiness Self-Assessment	Homemade
California State Polytechnic University, Pomona	Online Readiness Self-Assessment	Homemade
Sacramento	Online Readiness Self-Assessment	Homemade
San Bernardino	Online Readiness Self-Assessment	Homemade
San Diego State University	Distance or hybrid readiness survey	Homemade
San Francisco State University	Online Readiness Self-Assessment	Homemade
San José State University	Ecampus, CSU Stanislaus, University of North Carolina	Commercial, Homemade
California Polytechnic State University, San Luis Obispo	Online Readiness Self-Assessment	Homemade
San Marcos	Online Readiness Self-Assessment	Homemade
Sonoma State University	Online Readiness Self-Assessment	Homemade
Stanislaus	CSU Stanislaus assessment	Homemade

SF State Investigates Student Online Performance and Persistence

SF State, like its colleague campuses, has studied the issue of student retention and poor performance in online courses through its faculty governance bodies and administrative departments. Policy-setting boards such as the Online Education

Committee, which advises the academic senate on online technology, has raised concerns about student persistence in online courses in their discussions. The SF State Education and Technology Advisory Committee (ETAC), which advocates for SF State faculty needs with respect to all aspects of technology related to effective teaching and learning, scholarly research and creative activities, has conducted student surveys that include measuring attitudes towards technologies and student performance in online and regular classes. The surveys are published by Educause and provide national information on students' online preferences in addition to local campus data. These concerns by governance committees are equally reflected in CSU initiatives and in SF State's Academic Technology's (AT) research and activities.

SF State's Academic Technology department (AT) has supported and advanced effective learning and teaching with technology by implementing supports to help instructors prepare students for success in their online courses. AT provides instructors with an online tutorial called *QuickStart for Faculty* (https://athelp.sfsu.edu/hc/en-us/articles/212835427-QuickStart-for-Faculty) that shows faculty how to prepare their courses for meaningful experiences for their students. AT staff provide real-time assistance to help both faculty and students access and use their online course resources. AT staff are also available for personalized student help.

CSU created the Quality Online Learning and Teaching (QOLT) program to address the need for quality teaching standards for asynchronous online courses. The QOLT program has established 24 critical standards that were drafted to assist faculty,

faculty developers, and instructional designers to more effectively design and deliver online-blended courses. AT has offered QOLT-related training to the SF State campus community. In the future, AT may decide to join other CSUs in making online readiness assessments available to the campus.

Selecting an Online Readiness Assessment

Most online readiness assessments used within the CSU are homemade, unpublished, and have not undergone validation; or, they are commercial and proprietary. Dr. Glenn Pillsbury confirmed that CSU Stanislaus makes his online readiness assessment available to all online students prior to enrollment. The intended result of the assessment is to help students decide whether to enroll in an online course (personal communication, February 23, 2016).

Given the interest by many university governance bodies, the researcher determined to investigate if any of the assessment instruments available in the CSU could be used to help predict student success in online courses. Although there were many online readiness assessments available at the time of the study, the researcher determined that ToOLS was a good candidate for this first study at SF State because its predictive validity had been established by prior research (Kerr, Rynearson, & Kerr, 2006) and the prior study's methodology was available to be replicated at SF State. Predictive validity involves testing a group of subjects for a certain construct and then comparing them with results obtained at a point in the future. This study provided the first empirical research on the predictive value of ToOLS for SF State asynchronous undergraduate courses.

Based in part on self-directed learning theory (Knowles, 1975), which emphasizes independent learning and self-regulation, the Test of Online Learning Success (ToOLS) is a 45-question online readiness assessment offered by higher education institutions including CSU Chico. ToOLS was designed to predict success in online courses as evidenced by end-of-course grades, and was published on Multimedia Educational Resource for Learning and Online Teaching (MERLOT). Unlike other assessments used within CSU, the ToOLS questionnaire and scoring scheme was open source and designed to be easily replicated. While the 2006 validation study (Kerr, Rynearson, & Kerr, 2006) found that ToOLS predicted student success in online courses, this study chose to evaluate its effectiveness in predicting student success at SF State. Although many factors constitute student success, for the purpose of this study, student success was expressly and narrowly defined as end-of-course grades. Course retention has also been found to be a measure of student success (Tinto, 2012) but was excluded as a factor in this study due to its scope. The study recruited a more ethnically diverse sample of students than was used in the 2006 Kerr et al. study, which was conducted in suburban Texas with a small sample (N=56) of mostly White students. By comparison, the SF State sample population had a higher proportion of ethnic diversity, including African-American, Latino/a, and Asian-American students (see Table 5). Given that research had found that African-American and Latino students did not do as well as Caucasian and Asian students in online courses (Jaggars, 2011; Kaupp, 2012), the SF State Study would expand the evaluation of ToOLS to these populations.

Significance of the Study

At SF State, the growth of asynchronous online students had generated an increase in demand for supports. As noted earlier, SF State had been responding to the need through AT, which deployed strategies to help students succeed and instructors improve online learning success. AT provided workshops to help instructors design and adapt courses for asynchronous online learning and personalized counseling services to customize support and professional development to help instructors and staff acquire technology skills. However, more basic research was needed to understand how well these and other supports worked. Because SF State may offer additional online readiness assessments as a new strategy for addressing student unpreparedness for online learning, research into ToOLS' utility was seen as possibly yielding important insight for policy makers as they considered new approaches. Aside from the practical benefit, a study of ToOLS' efficacy provided an important opportunity to assess how well self-directed learning theory (SDL) upon which the assessment was based could be applied to supporting student success in asynchronous online courses.

A study that assessed the viability of an online readiness assessment for SF State students would inform the university's governance community in its decision-making, and a validated test of the ToOLS instrument would help in the considerations. This study was designed to explore whether ToOLS was an effective predictor of success in online courses and whether it could help all students make more informed choices when deciding whether to enroll in an asynchronous online undergraduate course. It was

important to conduct a study of ToOLS' predictive validity with a larger urban and ethnically diverse sample that reflected the SF State population. The following research questions were developed to guide this study.

Research Questions

1. Does the ToOLS assessment instrument predict student success in asynchronous online courses as evidenced by end-of-course grades at San Francisco State?
2. What are students' attitudes and perceptions toward using ToOLS?

LITERATURE REVIEW

Online readiness is a construct guided by theories of self-regulated learning (SRL) (Zimmerman, 2002) and self-directed learning (SDL) (Knowles, 1975; Merriam, 2001). Research involving the ongoing problem of higher online failure and dropout rates in online courses was compared to rates in traditional face-to-face courses. The literature had suggested that online readiness could be a predictor of student success in online courses. Self-directed learning theory, as a key construct for understanding and defining online readiness, was evaluated. Research indicated that online readiness assessment instruments, developed in large part on self-directed learning theory, could be useful in predicting student success. Evaluation of ToOLS would determine its effectiveness in predicting student success using end-of-course grades for SF State online students.

Theoretical Framework

Self-regulated learning provides a theoretical framework for understanding how ToOLS can contribute to student learning and students' preparation for the online learning environment. Self-regulated learning is a process by which students redirect their mental abilities into academic skills. One of the central themes of SRL theory according to Zimmerman (2002) is that students who monitor their behavior to track their own performance can pace themselves towards achieving their learning objectives. As a diagnostic instrument, ToOLS can provide students with feedback about their readiness

for online learning to enhance their ability to track and plan their own performance. In particular, ToOLS alerts students if they exhibit weakness in certain skills that have been identified as potential predictors of online achievement such as computer skills or reading or writing skills. The evaluation suggests action steps that students can take to address those deficiencies such as seeking tutoring help. ToOLS also alerts users that their scores identify them as fitting a profile that is particularly challenged in the online learning environment. For instance, users who are found to fit a profile as a "dependent learner" are informed that they need to take additional action in order to succeed in an online course. Additional action steps might include establishing a rapport with a classmate quickly or seeking additional assistance from the course instructor (Kerr et al., 2006). These data and feedback have been designed to give students the knowledge to modify their behaviors in order to succeed in their online course.

Self-Regulated Learning Theory

Self-regulated learning theory was developed by Zimmerman (1994) to articulate the process of the independent learning of successful students. The theory describes three major phases of learning (see Figure 4). First, the *Forethought Phase* is composed of task analysis and self-motivation and describes the part of the learning process where students set goals, plan their learning strategy, and develop self-motivation for learning. The second phase, the *Performance Phase,* describes the process referred to by Zimmerman as *self-control* where students apply specific methods and approaches selected during the Forethought Phase. At the same time, students observe and self-record personal events or

self-experimentation as they apply their approaches to discover the causes of these learning events. The third phase, the *Self-Reflection Phase,* describes a self-judgment process where students compare their self-observed performances against some standard such as their prior performance and the consequent positive or negative feelings associated with their self-reaction. According to Zimmerman, for successful students, learning is an activity that they do for themselves rather than as a reactive, passive response to teaching. Students who self-regulate are active learners who are aware of their strengths and limitations and who are guided by personally established goals and task-related strategies. As a result of their enhanced drive and adaptive learning techniques, self-regulated students have been found to be more likely to succeed academically and to have greater satisfaction (Zimmerman, 2002).

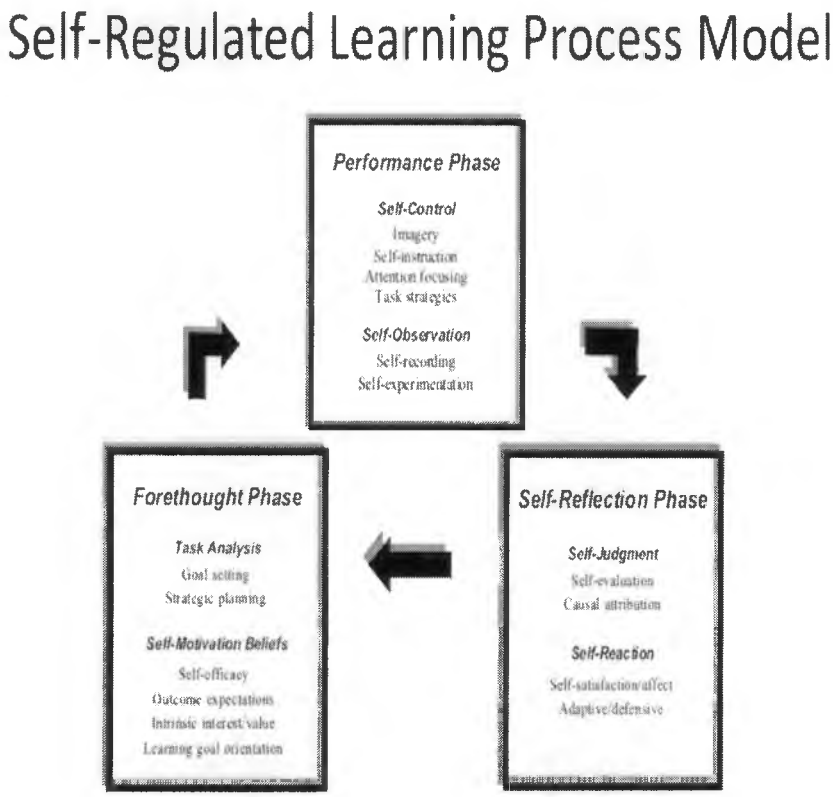

Figure 4. Self-regulated learning process model (Zimmerman, 2002, p. 67).

Self-Regulated Learning Process Model with ToOLS

TOOLS can be added (see Figure 5) to Zimmerman's self-regulated process model (2002) with a campus-specific online readiness webpage as an integral component of a student's Self-Reflection Phase. With enhanced self-awareness and information, asynchronous online students will be better prepared for the Forethought Phase, where

they engage in task analysis and form self-motivation beliefs essential for the Performance Phase.

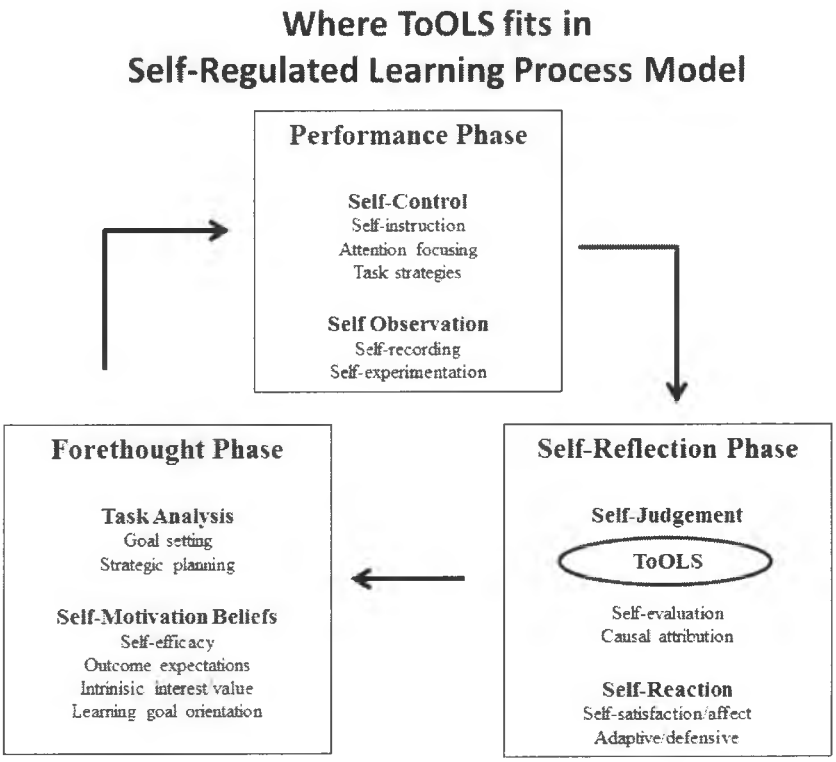

Figure 5. Where ToOLS fits in self-regulated learning process model (Zimmerman, 2002).

While Zimmerman's self-regulated learning model helps us understand where ToOLS can fit in the process of self-learning, it is important to understand the theoretical basis for the construct of online readiness upon which ToOLS and other online readiness instruments have been based. The self-directed learning theory (Knowles, 1968, 1970, 1975; Merriam, 2001) with its major themes of self-discipline, self-monitoring, and self-

initiative serves as the foundation for online readiness and online readiness assessment instruments.

Self-Directed Learning Theory

Self-directed learning theory was developed in the 1970s by Knowles (1975) to differentiate the field of adult learning from pre-adult learning. To juxtapose it with pedagogy, defined as "the art and science of helping children learn," Knowles defined SDL as "the art and science of helping adults learn" (as cited in Merriam, 2001, p. 3). According to Knowles, every self-directed learner shares five characteristics: 1) each has an independent self-concept and can direct his or her own learning; 2) each has accumulated a reservoir of life experiences that is a rich resource for learning; 3) each has learning needs closely related to changing social roles; 4) each is problem-centered and interested in immediate application of knowledge; and 5) each is motivated to learn by internal rather than external factors (Knowles, 1975; Merriam, 2001).

With the advent of distance learning in the 1990s and its particular learning format, which requires students to work independently and outside the structure and support available in traditional face-to-face classes, scholars began looking at SDL theory as a model for understanding how it could be used to understand student learning in online courses. Song and Hill (2007) created a conceptual model for understanding how student learning processes, personal learning attributes, and learning context interact and influence each other in online learning. In the two decades since the emergence of online learning, scholars have found that characteristics common to successful online learners

are many of the same identified by SDL theory, such as independent self- learning and a motivation to learn by internal rather than external factors (Dabbagh, 2007; Smith, Murphy, & Mahoney, 2003). As researchers sought to understand online readiness and to develop online readiness instruments, many turned to SDL theory and identified characteristics of successful independent learners to form the basis of their work. Yukselturk and Bulut (2007) found that the effect of self-regulation variables (cognitive strategy use and self-regulation) on student success in an online course was statistically significant. Dabbagh (2007) found that comfort with reading and writing and proficiency with computers are important skills. Boyd (2004) identified good time management skills as vital to online success. Lynch and Dembo (2004) found that verbal ability along with self-efficacy—learners' judgment of their ability to plan and carry out the necessary behaviors to achieve their educational goals, as defined by Bandura (1993)—related significantly to performance as measured by final course grade. In fact, ToOLS was developed to identify, assess, and measure these and other characteristics in online students and to predict their online success based on how well they score (Kerr et al., 2006).

Growth of Online Courses at SF State

SF State has expanded its online course offerings significantly in the last decade. During this period, as noted earlier, the number of fully online course sections increased from 19 in Spring 2005 to 131 in Fall 2015. Student enrollment in asynchronous online courses saw an eight hundred percent increase from 1,213 to 11,461. While online

courses continued to grow, student attrition and dropout rates in online courses remained stubbornly high nationally. Many SF State students who are first-generation, low-income, and from African American or Latino/a populations were identified as susceptible to failure or dropping out as the rate of online courses expanded (Jaggars, 2011, 2014; Jaggars & Bailey, 2010; Kaupp, 2012; Xu & Jaggars, 2013).

Students Failing at Higher Rate Online Than in the Classroom

As more university courses were offered in a fully online format, it became possible that dropout rates would continue. According to a 2014 Public Policy Institute of California (PPIC) report, *Online Learning and Student Outcomes in California's Community Colleges* (p. 7):

> Course success rates are lower in online courses than in traditional courses. In 2011-12,79.4% of all students enrolled in online courses completed these courses, compared to 85.9% among those enrolled in traditional courses. Moreover, 60.4 percent of all students enrolled in online courses completed with a passing grade—10 percentage points lower than the average success rate in traditional courses (70.6%).

Achieving success in online learning may require a unique skill set in addition to that required for success in face-to-face instruction. Lack of self-discipline (Rovai, 2003), time management skills (Liu, Gomez, Khan, & Yen, 2007) and passivity to one's approach to learning (Bullen, 2007) have been identified as contributing obstacles to student success in online learning. Increasingly, educators are recognizing the need to

provide students in asynchronous online courses with support to enhance their time management skills, reading and writing proficiency, and technology skills so that they may better adapt to the online format (Hart, 2012; Morris & Finnegan, 2009; Tyler-Smith, 2006). Moreover, identifying students who may be prone to struggling in the online environment and, according to research, targeting them for interventions and individualized support may help them persist and succeed in online courses (Hachey, Wladis, & Conway, 2012; Lee & Choi, 2011; Willging & Johnson, 2009; Yen & Liu, 2009).

Reasons Why Students Fail Online Courses

Research has identified a number of potential barriers to online success. The reasons for student dropout include lack of peer social interaction, poor time management skills, and poor academic preparation for the course being taken (Jaggars & Bailey, 2010; Kaupp, 2012; Means et al., 2014). Weak time management skills pose a barrier to successful completion of coursework in both online and face-to-face courses. However, online courses especially require students to independently complete their work. Students who lack time management skills and an ability to function independently can sometimes struggle to complete an online course. Many students who require remedial coursework often lack the associated time management skills to succeed in either face-to-face or online courses.

Any of these conditions can contribute to failure in an online course. The subsequent circumstances such as having to re-enroll in impacted required courses,

delayed graduation, and dropping out altogether may be especially debilitating for underrepresented students. Yet at SF State, the online courses are often the only option to enrollment in a *bottleneck* course, a course that is required but only available online.

Focus on Online Readiness

While there are many reasons why students fail online courses at higher rates than traditional face-to-face courses, research has found that certain learner characteristics make students more prepared than others to succeed. Early identification of these characteristics, which constitute online readiness, can help students persist and succeed in online courses (Beaudoin, Kurtz, & Eden, 2009; Gascoigne & Parnell, 2014; Watkins, Leigh, & Triner, 2004). The ToOLS online readiness assessment instrument is a promising online (Alem et al., 2014; Kerr et al., 2006) readiness detection and success prediction tool that is being used at Chico State and may be a candidate for introduction at SF State.

Defining Online Readiness

Historically, measuring online readiness has been challenging because the literature contains a considerable range of definitions as to what constitutes online readiness. Online readiness has been defined broadly as the student's ability to use a computer to access a course (Song & Hill, 2007) and more narrowly as a student's likelihood to succeed in an asynchronous 100% for credit online course (Watkins et al., 2004).

Warner, Christie and Choi (1998), in an often cited study, considered (1) students'

preferences for the form of delivery as opposed to face-to-face classroom instruction; (2) student confidence in using electronic communication for learning and, in particular, competence and confidence in the use of Internet and computer-mediated communication; and (3) students' ability to engage in autonomous learning as essential characteristics for online readiness. Another influential view is supported by Mattice and Dixon (1999), who stressed students' interest in learning online as well as their readiness for distance education as equally important to readiness. McVay (2001) focused on general learner characteristics such as self-directed learning, interpersonal communication skills, academic locus of control, and basic technology skills (ability to use email, word processing, and basic software) as key factors. Finally, a checklist for characteristics and skills that were described as essential to online learning success was created by Dabbagh (2007). This checklist included a strong academic self-concept, fluency in using online learning technologies, interpersonal and communication skills, valuing interaction and collaborative learning, possessing an internal locus of control, and self-directed learning skills.

Universities and CSU Turn to Online Readiness Tests

Universities are turning to online readiness assessments including unpublished and un-validated faculty/staff-created instruments to help increase retention rates and to identify students who are not prepared to succeed in online courses (Alem et al., 2014). CSU Fully Online is a CSU-wide portal to online courses. It provides an online readiness assessment called the Online Readiness Self-Assessment (California State University,

n.d.) for all the courses in the portal. This instrument is a modified version of an unpublished, un-validated, and homemade (faculty/staff created) instrument created by Pillsbury to help students assess their preparedness for online learning. Additionally, several of the 23 CSU campuses provide students with a campus-hosted online readiness webpage in addition to the self-assessment instrument. These and other instruments were found by Alem et al. (2014) to vary widely in their psychometric properties, validation, and publication.

The Growth and Development of Online Readiness Tools

Over the last decade, higher education has turned to self-reported online readiness assessment instruments and surveys to help students decide if they are prepared to succeed in online courses and to increase online course completion rates (Dray et al., 2011; Pillay, Irving, & Tones, 2007). With the cost of student failure and drop-out high for the institution and the student, increasing student success rates in online courses may help increase overall student retention and success (Cochran et al., 2014; Vogel, 2013).

Online readiness assessments share a common approach in which subjects are asked to self-report their attitudes and beliefs about online learning as well as their personal learning preferences. These instruments tend to include questions about individual equipment access and ownership. They also include questions about personal self-awareness of academic skills, familiarity with technology, and locus of control (Dray et al., 2011).

Generally, assessments of online student readiness (Bernard et al., 2004; Mattice

& Dixon, 1999; McVay, 2001) assess student characteristics such as self-directed learning, interpersonal communication skills, and academic locus of control and basic technology skills such as email, word processing, and basic software familiarity. The development of online readiness assessments between 1999-2006 can be chronicled by four published online readiness assessments: the Mattice and Dixon survey (1999), the McVay (2001) Readiness for Online Learning Questionnaire, the updated McVay Bernard et al., 2004 questionnaire, and the Test of Online Learning Success (Kerr et al., 2006). Online readiness assessments evolved from basic self-reported surveys that reported student attitudes towards online learning to more sophisticated assessments that took into account academic skills, self-directed learning, and need for online learning.

Mattice and Dixon (1999) developed a survey to assess their students' interest in learning online and their readiness for distance education. The instrument asked students about their prior online course experience, time management skills, need for structured guidance, interest in online classes, length of commute, and time allocated for learning and their access to technology and interest in enrolling in an online course.

Dray et al. (2011) reported that the Mattice and Dixon survey relied on three indices: 1) student readiness, referred to as the *readiness index*; 2) student access to technology, known as the *technology index*; and 3) student interest in online learning, referred to as the *interest index*. The readiness index consisted of questions about students' self-direction, orientation to time, and preferences for feedback. The technology index focused almost entirely on student access to the Internet and email, and

their level of experience with these instruments. The interest index queried students about their interest in distance education (Dray et al., 2011).

McVay (2001) introduced a 13-item survey to measure readiness for online learning. This instrument assessed students' proficiency with the basic skills and aspects of online learning, such as discussion boards and navigating the online environment, and their independence as learners. In 2003, Smith et al. investigated the reliability and validity of McVay's survey and found that it was reliable and resulted in a two-factor structure—comfort with online and self-management of learning—but that more work was needed to establish predictive validity (Smith et al., 2003). In 2005, Smith repeated the study and demonstrated that McVay's survey was a reliable and valid instrument for measuring self- management of learning and comfort with online learning (Smith, 2005).

Bernard, Brauer, Abrami and Surkes (2004) developed a new survey expanding McVay's original 13 items to 38 items in order to predict student online success. The results were significant F-4.0 (4,132) $p<0.01$. The predictors accounted for 8.0% of the variance in course grade (Bernard, Brauer, et al., 2004, p. 37). A factor analysis revealed that 25 of the questions clustered around the following constructs: beliefs about distance education, confidence in prerequisite skills, self-direction and initiative, and desire for interaction. The updated McVay instrument asked students to report their beliefs in the efficacy of the Internet to provide learning and their self-assessment as to their ability to succeed in an online course. Bernard and his collaborators improved McVay's original survey by combining student self-efficacy with technology.

Kerr, Rynearson and Kerr (2006) introduced the Test of Online Learning Success (ToOLS), which used a metacognitive approach to student online readiness assessments. By taking elements from existing instruments such as Rosenberg's (1965) self-esteem scale, Felder and Soloman's (2005) index of learning styles, Taraban, Kerr, and Rynearson's (2004) metacognitive reading strategies questionnaire, Shia's (1998) academic intrinsic motivation questionnaire, and Trice's (1985) academic locus of control scale, they created a new assessment tool that not only assessed preparedness for online learning but also predicted online learning success. Their instrument consisted of five subscales: computer skills, independent learning, need for online learning, academic skills, and dependent learning.

Kinds of Online Readiness Assessments Available

Many varieties of online readiness assessments are in use today. As described earlier, they fall into three categories: public domain, homemade, and commercial. Online readiness assessments that are published in the public domain, such as ToOLS, are free and designed to be easily replicated and scored. Those that are homemade assessments developed by a team of faculty and staff, such as the Online Readiness Self-Assessment created by Pillsbury and the modified version used by CSU Fully Online are generally not validated or published (Alem et al., 2014; Gascoigne & Parnell, 2014). Instruments that are published, such as CSU East Bay's VARK questionnaire that tests for visual and written literacy, are sold through a private entity (Leite, Svinicki, & Shi, 2010). Some of the most well-known and published readiness instruments include

ToOLS, the Mattice & Dixon survey; Bernard, Brauer et al. questionnaire; and the McVay questionnaire, which are shown in Table 3.

Table 3.

A Selection of Well-Known Assessments

Instrument	Year	URL	Format	Description	Type **	Predictive Validity	Validated
ToOLS	2006	https://www.merlot.org/merlot/viewMaterial.htm?id=731719	45-question, Likert Scale	Tests for academic and computer skills, dependent and independent learning preferences, need for online learning	Pub, PD	▯	▯
VARK	1987	http://teachonline.csustan.edu/selfassessment.php	16-question, multiple choice	Tests for Visual, Aural, Read/write, and Kinesthetic sensory modalities	Pub, Pr		▯
CSU Chancellor Online Readiness Self-Assessment	2006	https://csrc.collegesource.com/view/csrc_assessment.aspx	15-question, binary	Tests for learning preference, computer skills, time management	H, PD		
CSU Stanislaus Online Readiness Self-Assessment	2006	https://csrc.collegesource.com/view/csrc_assessment.aspx	15-question, binary	Tests for learning preference, computer skills, time management	H, PD		
McVay Readiness for Online Learning Questionnaire	2000	N/A	13-question, Likert Scale	Tests for learning preference, motivation for online learning, time management, planning	Pub	▯	▯
Mattice & Dixon	1999	N/A	19 question, Likert Scale	Tests for learning preference, computer skills, time management	H, PD	▯	▯
Bernard, Brauer, et al.	2004	N/A	38-question	Tests for learning preference, computer skills, time management	Pub, PD	▯	▯

** TYPE: H = Homemade; PD = Public Domain; Pr=Proprietary; Pub=Published

In 2014, Alem et al. conducted a systematic review of 5,107 published and unpublished papers between 1990 and 2010 on online readiness instruments and found that only 10 instruments recurred frequently in searches and that there was little standardization across online readiness assessment instruments. Moreover, they found that few published instruments had demonstrated good psychometric qualities and many unpublished instruments were developed by university professors without regard to their psychometric qualities. Alem et al. concluded (p. 381):

> This systematic review has identified the lack of standardization among these published and unpublished tools as a factor that could discourage the students from using them due to their heterogeneity. A valid and reliable student online readiness tool is very essential in order to identify students who are ready to take online courses, and to reduce withdrawal rate.

Table 4.

Methodological Quality of Reviewed Studies (Alem et al., 2014)

Authors	**Type of Research***	**Content Validity**	**Pretest / Pilot Test**	**Construct Validity**	**Relia-bility**	**Number of Dimen-sions/ Total scale**
Bernard et al. (2004)	Exp.			▯	▯	4/9 Items
Kerr et al. (2006)	Exp.			▯	▯	5/45 Items
Mattice & Dixon (1999)	Exp.				▯	3/22 Items
Muse (2003)	Exp.			▯	▯	7/26 Items
Osborn (2001)	Exp.	▯	▯	▯	▯	6/20 Items
Parnell & Carraher (2003)	Exp.	▯		▯	▯	3/9 Items
Pillay et al. (2007)	Exp.			▯	▯	4/18 Items
Roblyer et al. (2008)	Exp.	▯		▯	▯	4/25 Items
Smith (2005)	Exp.			▯	▯	2/12 Items
Watkins et al. (2004)	Exp.	▯		▯	▯	6/27 Items

*Exp = Exploratory; Con = Confirmatory

Within the 23-campus CSU system, homemade or faculty-created online readiness assessments are the most common. In addition, every campus links to the CSU Fully Online website, which features Pillsbury's Online Readiness Self-Assessment.

Interview with Glenn Pillsbury, Creator of the Online Readiness Self-Assessment

Pillsbury, the creator of the Online Readiness Self- Assessment created the

instrument in 2010 for the CSU Stanislaus online community (personal communication, February 23, 2016). While he did not have longitudinal student enrollment data for online courses at CSU Stanislaus, approximately 4,600 students were enrolled in asynchronous online courses in Fall 2015 on that campus. Moreover, every student interested in enrolling in an online course was asked to take the Online Readiness Self-Assessment as part of the campus course registration process. He granted permission to the CSU Chancellor's office to modify the instrument for use as part of CSU Fully Online in 2014. According to Pillsbury, the instrument has not been published, validated, or studied for its psychometric properties. However, Pillsbury believes it has been used by thousands of students across the CSU although he has no usage data. The instrument was created to measure student readiness for online learning but was not designed to predict student success in online courses. Pillsbury added that he did not track how other institutions used his instrument, and did not know if his instrument was being used according to his intention. Pillsbury stressed that he felt there was a need to do more research around his instrument especially since it was now available to every CSU student.

Test of Online Learning Success

The Test of Online Learning Success is a self-reported survey (see Appendix B). It consists of 45 questions grouped into five subscales that measure five areas related to online readiness: computer skills, independent learning, dependent learning, need for online learning, and academic skills. Users answer each question using a 5-point Likert scale and after submission, they receive a programmed score report based upon their

answers.

ToOLS was the only assessment used within the CSU that had been published in the public domain through MERLOT. It was validated through the published study by Kerr et al. (2006) and was designed to be easily replicated and scored. Moreover, ToOLS' construct validity and reliability were verified in two studies (Alem et al., 2014; Kerr et al., 2006).

ToOLS is currently being used by CSU Chico as part of their campus-hosted Online Readiness Evaluation for Students webpage and as part of that university's Center for Excellence in Learning and Teaching's efforts to help students succeed in online courses. Students considering registering for an online course must complete the ToOLS assessment before they register. Upon completion and receipt of their scores, students are directed to return to the webpage to find further instructions based upon their scores. Students who score high (between 194-201 points) are informed that they may sign up for the online and hybrid course without further preparation. Students who score below 194 points are directed to seek additional preparation or guidance based on their subscale scores. The assumption is that the ToOLS score is predictive of online success, and students are presented with guidance based upon their performance on the assessment.

ToOLS' Predictive Validity

Kerr et al. (2006) examined the predictive validity of ToOLS with a subgroup of their sample (N=56) who had submitted end-of-course grades. They found that only one subscale, Academic Skills, was predictive. Stepwise regression was used to determine

how much end-of-course grades were explained by the ToOLS subscales. When all five subscales were entered into the equation, only Academic Skills remained as a significant contributor to course performance ($\beta = .312, p = .019$). The stepwise selection demonstrated that Academic Skills predicted 9% of the variance in end-of-course grades. The present study replicated the validated ToOLS instrument with a sample of SF State undergraduate asynchronous online students that was three times the size (N=166) of the original study.

The limitations of the 2006 Kerr et al. study of ToOLS' was that it did not have a large enough sample (N=56) to make a valid, generalizable claim of validity, and could not be representative of the diversity of students in SF State's asynchronous online courses. Moreover, a validation study of an online readiness instrument conducted with asynchronous online students at SF State had not been done. A database search of EBSCOhost, ProQuest, and Google Scholar search engines yielded no studies of online readiness instruments of any kind conducted at SF State or within the CSU.

METHODS

The goal of this study was to determine the extent to which ToOLS could predict student success in asynchronous online undergraduate courses at SF State and to discover the attitudes of SF State asynchronous online students towards using ToOLS. An additional interest of the research was to assess how ToOLS' predictive value corresponded to the SDL theory from which the instrument was partially derived.

Research Design

This research used a pretest/posttest, one control group experimental design with ToOLS completion operating as the study stimulus. The surveys were administered in five undergraduate asynchronous online courses in Fall 2015 with a total sample of 166. The pre-survey collected demographic data and other characteristics of participants. The ToOLS survey measured student online readiness, and related the results to student final course grades as a measure of success in each course. Students in Fall 2015 PLSI 200-13 and PLSI 200-18 (N=166) sections were offered ToOLS while students in Spring 2015 PLSI 200-4 and PLSI 200-5 (N=176) were not and served as the control group. The post-survey captured students' final grade in the course and their attitudes towards using ToOLS. Demographic and preparedness differences between students as well as different attitudes towards online learning present compounding factors in the study.

Research Hypothesis

The researcher hypothesized that if ToOLS accurately predicted student success, the study might find a correlation between students' ToOLS scores and their final course grades. Conversely, he hypothesized that students who scored low on TOOLS would receive lower grades by comparison or would fail to complete the course. Moreover, if ToOLS was found to be potentially helpful to students, the study might lead to a larger more representative study to investigate the assessment's value for SF State.

Research Questions

The study was designed to answer and shed insight into the following two research questions:

1. Does the ToOLS assessment instrument predict student success in asynchronous online courses as evidenced by end-of-course grades at San Francisco State?
2. What are students' attitudes and perceptions toward using ToOLS?

SF State Sample and Undergraduate Population

There were 11,461 students enrolled during the fall semester 2015 in 131 sections of SF State's fully online undergraduate courses in 32 subjects, ranging from Anthropology to Women and Gender Studies. A convenience sample of 166 SF State students enrolled in five asynchronous undergraduate online courses was drawn from the following instructors' courses: Kevin Kelly (ITEC 299-01), Bruce Heiman (IBUS 130-01), Bill Sokol (Labor 251-01), and David Lee (PLSI 200-13 and PLSI 200-18). In order to isolate the effect of ToOLS, the researcher compared four identical sections of the

same, asynchronous PLSI-200 (American Government) online course. The final grades and ToOLS scores of two sections (13 and 18) of PLSI 200, which received ToOLS, was compared to two sections (4 and 5) of PLSI 200, which did not receive ToOLS. Note that data from previous sections of ITEC 299, IBUS 130, and Labor 251 were not requested and that a similar analysis could not be done for those three courses.

The sample, N=166, represented a 17.9% response rate that was drawn from a total student enrollment of 925 students in the ITEC (299-01), IBUS (130-01), Labor (251-01), PLSI (200-13), and PLSI (200-18) courses. The sample comprised 1.4% of the total asynchronous online undergraduate Fall 2015 student population. Table 5 compares the sample to the total SF State enrollment demographics. There were 8.8% more women and 8.7% fewer men in the sample than in the population as a whole. There were 14.9% more Caucasians and 5.2% fewer Asians. Comparisons cannot be made with the asynchronous online student total population because the data were not collected. Therefore, the study sample cannot be generalized to the total student population.

The Sample Demographics and the Impacts on the Study

ToOLS has been used by many higher education institutions, including CSU Chico. To be considered for SF State, it needed to be validated for the very different SFSU student population. As mentioned previously, ToOLS was originally validated by Kerr et al. in 2006 using a small sample (N=56) from suburban central Texas. Evaluation of the instrument's effectiveness for SF State meant a study needed to be done with a larger, more diverse sample.

Table 5.

Study Sample vs. SF State Student Population.

SFSU UNDERGRADUATE ENROLLMENT 2014-2015			STUDY SAMPLE		
By Gender	**Number**	**%**	**Number**	**%**	**% Difference**
Women	15,094	56.2	108	65	8.8
Men	11,721	43.7	58	35	-8.7
SFSU UNDERGRADUATE ENROLLMENT 2014-2015			**STUDY SAMPLE**		
By Ethnicity	**Number**	**%**	**Number**	**%**	**% Difference**
African American	1,283	5.5	9	5.6	0.1
American Indian, Alaskan Native	91	0.4	1	0.6	0.2
Asian (including Filipino)	8,096	34.8	49	29.6	-5.2
Chicano, Mexican American	3,939	16.9			
Latino	1,953	8.4	29	17.3	0.4
Pacific Islander	355	1.5			
Two or more Races	1,604	6.9			
White Non-Latino	5,938	25.5	62	37	11.5
Total	**23,259**		**166**	*90.1	

*Does not add up to 100%. 9.9% of study sample chose OTHER to describe their race. Source of SF State Undergraduate Enrollment: SF State Academic and Institutional Studies http://air.sfsu.edu/ir/enrollment/census

According to researchers, many factors impact student grades, including individual characteristics (race, gender, age), student learning preferences, prior online course experience, familiarity with computers and online environments, and prior academic achievement (Jaggars, 2011; Mattice & Dixon, 1999; Wojciechowski & Palmer, 2005; Yukselturk & Bulut, 2007). The measure of final grade alone cannot account for any of these factors. Hence, for this study, data on these factors were gathered in the pre- and post-surveys.

SF State collects student demographic data on all online undergraduate students, and at the time of the study (Fall 2015) 11,461 students were enrolled in asynchronous online undergraduate courses. However, because the data were not readily reportable, the

researcher did not analyze how the population of asynchronous online students in the study sample compared demographically to the entire SF State undergraduate asynchronous online population. Additionally, the study sample was not randomly generated and so could not be generalizable to the entire population. The study nevertheless captured a rich dataset of student demographics including race, gender, age, and prior online course experience in asynchronous online undergraduate courses. This study used this dataset to examine how these factors related to ToOLS' outcomes and student attitudes towards using ToOLS.

Structure of the ToOLS Instrument

ToOLS is a 45-question instrument covering five measurement scales with items scored on a 5-point Likert scale. The instrument is composed of five subscales—computer skills, independent learning, dependent learning, need for online learning, and academic skills—that each measure a separate dimension of online readiness. The subscales are described as follows:

- **Computer skills**: the basic computer literacy necessary to navigate within the online course
- **Independent learning**: the ability to complete assignments on time and keep up with coursework
- **Need for online learning**: the motivation for pursuing online coursework
- **Dependent learning**: the lack of skills to learn on one's own
- **Academic skills**: strong reading and writing ability and critical thinking skills

Subscales are independently scored and reported so that the student may know his or her performance in each area. Scores from all five subscales are then summed together as an Overall Learning Success (OLS) score. The reliability of this OLS has been previously established (Kerr et al., 2006). Reliability was also checked in the present study. Cronbach's alpha for the five subscale scores was .65 ($df=161$, $p<.05$), confirming the internal reliability of the OLS.

Upon completion of the assessment, students receive a score report with advice based upon the OLS (0-225 points) and on each subscale. Students who score between 202-225 points on the OLS receive Report 1, "More Than Prepared for Online Learning." A score of between 190-201 earns the student Report 2, "Ready To Go." Students scoring between 178-189 points receive Report 3, "Take Some Notes." Finally, low scores between 0-177 earn the student Report 4, "Proceed with Caution."

Dependent Variable—Course Success

Student course success was operationalized as the final course grade. The final grade could be in the form of a traditional letter grade or credit/no-credit. Success was measured as a grade of C- or above or Credit. SF State requires a minimum grade of C- or Credit in order to pass undergraduate general education courses. Students who withdraw from their course after the deadline for dropping without penalty are registered as failing to complete the course successfully.

Student Attitudes towards Using ToOLS

The post-survey captured detailed responses from students on their attitudes

towards the value of the ToOLS assessment for them. Responses were analyzed for numbers of students who found ToOLS helpful to them and what kinds of help or guidance they thought ToOLS provided.

Administering the ToOLS Instrument

Pre-Survey Implementation

The pre-survey was administered immediately before ToOLS. The 26-question instrument (Appendix A) collected demographics and other data on characteristics of the population. It was administered by an embedded link via email and the data were captured in Qualtrics survey software. The overall response rate was 17.9%. The researcher created the pre-survey. The intent of the survey was to capture basic information from the participants such as race, sex, age, instructor, course name, and prior online course experience .

ToOLS Assessment Implementation

Immediately after completing the pre-survey, the participant was directed to complete the ToOLS online readiness assessment (Appendix B). ToOLS measures student preparedness for online learning success according to the five subscales noted above. Each of the five subscales consists of a battery of self-descriptions that the student ranks on a 5-point Likert scale. Four sub-scales—Computer skills, Independent Learning, Need for Online Learning and Academic Skills—were scored on a progressive scale. Dependent Learning was scored on a reverse scale because lower scores on Dependent Learning denote *more* dependence (less independence). Additionally, items 14, 36, and

37 were also reverse-scored. The combined score was then reported as the OLS (Overall Learning Success) score.

The researcher programmed the Qualtrics software to score student responses to the ToOLS instrument according to the directions provided by Kerr et al. (2006). The 45 items combined into the total OLS score of 225 points, and subscales were broken down in the following manner:

- Computer Skills (items 1 – 11)
- Independent Learning (items 12 – 21)
- Dependent Learning (items 22- 27)
- Need for Online Delivery (items 28 – 32)
- Academic Skills (items 33 – 45)

Description of Subscales and Report Scores

All subscales were assessed with self-reported responses on a five-point Likert scale to the prompts listed in Appendix B. The OLS score combines all scale scores for a possible total of 225 points. Upon completion of the self-assessment, ToOLS immediately reports to the student his or her OLS score and the individual score for each of the five subscales. The scores were accompanied by one of four reports as follows:

- **Report 1: More Than Prepared for Online Learning.** Students who scored between 202-225 points and/or in the top strata of any subscale were notified that they possess all the necessary personality traits, motivation, computer

skills, and academic skills that predict successful achievement in the online classroom.

- **Report 2: Ready to Go.** Students who scored between 190-201 points were informed that they are more prepared for online learning than 50-75% of their student peers. The student was advised to consider working with a peer to support each other's progress.
- **Report 3: Take Some Notes.** Students who scored between 178-189 points were asked to consider seeking additional information and assistance. They were advised that they could benefit from specific skill-building to improve performance and achieve a higher grade. Additionally, they were informed that skills such as reading comprehension, writing, and time management could be strengthened with the assistance of tutors and specific exercises.
- **Report 4: Proceed with Caution.** Students who scored between 0 and 177 points were informed that they might need additional support to help them succeed in an asynchronous 100% online course. They were advised to keep an electronic calendar of assignment due dates that sends audible reminders (alarms) and to discuss any learning needs with the instructor early in the course.

Determining the OLS and Subscale Scores

A total of nine items (14, 22, 23, 24, 25, 26, 27, 36, and 37) were reverse scored as these questions tested the student's dependence on supervised learning environments

such as those provided in traditional face-to-face courses. Students who scored high on these nine items were less ready for online learning than those who scored low. For instance, if a student chose to "strongly agree" with item 25, which stated, "I have trouble comprehending what I read," the student would be less prepared for online learning than a student who "strongly disagrees" with the statement. Therefore, item 25 was reversed scored. The five subscales were created by computing the means across the respective subscale items.

Finally, the student received a Need for Online Learning Score report in which he or she was informed of any needs for online learning. Each student received the following message:

> 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.

Calculating the Total Online Learning Success (OLS)

The OLS score combined the score of all 45 items with the nine items reverse-scored as noted above. Kerr et al. (2006) calculated the Likert scales and constructed a color-coded matrix, depicting percentile ranges based on previous test scores. ToOLS users could then compare their individual scores to the color-coded matrix to determine how well they performed.

Table 6 shows the student ToOLS scores as quartiles, which ToOLS refers to as *zones*. The zones range from lowest quartile to highest: Red Zone is the lowest quartile (0-25%), Orange Zone is the second lowest quartile (25-50%), Yellow Zone is the second highest quartile (50-75%), and Green Zone is the top quartile (75-100%). The OLS is computed as total points rather than Likert ratings.

Table 6.

Percentile Ranges for All ToOLS Scales

Scales	**Percentiles**			
	0	**25 (Red)**	**50 (Orange)**	**75 (Yellow)**	**100 (Green)**
OLS score		0-177	178-189	190-201	202-225
Subscale Ranges					
Computer skills		0-4.14	4.15-4.62	4.63-4.99	5.00
Independent learning		0-3.75	3.76-4.11	4.12-4.56	4.57-5.00
Dependent learning		0-3.39	3.40-3.85	3.86-4.31	4.32-5.00
Academic skills		0-3.58	3.59-3.84	3.85-4.13	4.14-5.00

Calculating Subscales

The individual student profile is determined from the student's subscale Likert scores (0-5 points) and compared to the matrix subscale ranges. As noted, subscale ranges were calculated by Kerr et al. (2006) from previous test scores and are presented to students by the ToOLS instrument in the appropriate color-coded zones. Students can compare their subscale scores to others who have completed ToOLS using the respective row in Table 4. Then, they can refer to the TOOLS Score Report (Appendix D) to find the identified skill level for each of their subscales. In addition to OLS and subscale scores, a report is generated describing their individual profile and includes advice based upon their scores.

Computer Skills subscale. The Computer Skills subscale includes question items 1-11. This subscale measures the basic computer literacy necessary to navigate within the online course. Scores in the range of 0-4.14 indict the student lacks the computer skills necessary to succeed in an online course. Scores in the range of 4.15-4.621 place the student suggest that the student needs remedial help to succeed in an online course. Scores in the range of 4.63-4.99 indicate the student has the computer skills necessary to succeed but may need additional support. Finally, students who score a 5 require no additional computer skills to succeed in an online course.

Independent Learning subscale. The Independent Learning subscale includes question items 12-21. This subscale measures the student's ability to complete assignments on time and keep up with coursework. Scores in the range of 0-3.75 indicate

the student lacks the independent learning skills necessary to succeed in an online course. Scores in the range of 3.76-4.11 indicate the student might require more help with time management to succeed in an online course. Scores in the range of 4.12-4.56 indicate the student has the independent learning skills to succeed in the course but may need additional support. Finally, students who score between 4.57 and 5 need no further preparation and are ready for online learning.

Dependent Learning subscale. The Dependent Learning subscale includes question items 22-27. This subscale is reverse-scored and measures the student's lack of skills to work on his or her own. Scores in the range of 0-3.39 indicate the student is too dependent on others for learning to succeed in an online course. Scores in the range of 3.40-3.85 indicate the student may need more help to overcome his or her dependence in order to succeed in an online course. Scores in the range of 3.86-4.31show that students in this range are less dependent but may need additional support to succeed. Finally, students who score between 4.32 and 5 need no further preparation for online learning.

Academic Skills subscale. The Academic Skills subscale includes question items 33-45. This subscale measures strong reading and writing ability and critical thinking skills. With scores in the range of 0-3.58, students lack the reading, writing, and critical thinking skills necessary to succeed in an online course. Scores in the range of 3.59-3.84 show that the student may need more help with these academic skills to succeed in an online course. With scores in the range of 3.85-4.13, the student has the academic skills to succeed in the course but may need additional support. Finally, students who score

between 4.32 and 5 have the reading, writing, and critical thinking skills to succeed in an online course.

Need for Online Delivery subscale. Unlike the other subscales, this series of items 28-32 identifies a need instead of a skill. If the student's Need for Online Learning average is 3.40 or higher, the student's 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 the student does not have a pressing need for online delivery of instruction at the time. If the student has an identified Need for Online Delivery (i.e., score above 3.40), then the following steps are suggested:

1. Complete all recommendations described under the *Proceed with Caution* section above.
2. Access and complete the tutorials provided in the report 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, the report advises students to seek tutorial help in the discipline, and/or language literacy, composition, or writing help.
5. If the test taker is identified as a dependent learner, he or she is informed to 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 his/her feedback on assignments prior to submitting them for grading.
- Discuss the deficit area with the course instructor early to determine how impactful he or she feels the weakness will be given the course requirements.

Post-Survey Instrument

The post-survey (Appendix C) consisted of 15 questions that asked participants to report their final course grade, their attitudes towards using the ToOLS instrument, and their perceptions of the value of an online readiness assessment at the end of the Fall 2015 semester. The post-survey was administered through Qualtrics between December 16, 2015, and December 25, 2105 (see Table 7). The instrument was not validated nor tested before it was administered to participants in this study.

Table 7.

Schedule of Survey Administration

Survey	**Date Administered**	**Method**	**Data Stored**
Pre-Survey	9/10/15-9/25/15	Email w/embedded link to Qualtrics	Qualtrics
TOOLS	9/10/15-9/25/15	Redirect to Qualtrics	Qualtrics
Post-Survey	12/16/15-12/25/15	Email w/embedded link to Qualtrics	Qualtrics

Data Collection and Analysis

The SF State Institutional Review Board provided the researcher with an

Exemption from Human Subjects Review determination on April 29, 2015. The survey commenced on September 10, 2015. It was administered in Qualtrics in three parts with the pre-survey and ToOLS survey completed at the beginning of the Fall 2015 semester (September 10, 2015 to September 25, 2015) and the post-survey at the end of the semester (December 16, 2015 to December 25, 2015). The pre-survey consisted of 26 questions. It was completed by students who used an embedded link in a solicitation email. Pre-survey questions gathered demographic data, previous asynchronous online course experience, technology access, and other basic information about the students. After completing the pre-survey, the students were immediately directed to complete the ToOLS assessment's 45 questions. The researcher programmed Qualtrics to score the ToOLS assessment according to Kerr et al.'s (2006) scoring instructions. Upon completion of the ToOLS assessment, the students received their score and an automatically generated message based upon their performance. At the end of the Fall 2015 semester, the participants were given the post-survey, which consisted of 15 questions including the reporting of their final grade earned in the course, an assessment of ToOLS, and an assessment of the course and instructor.

Instructors of undergraduate, asynchronous, online courses were asked to recruit their students to participate in the study (Appendix F). Four SF State instructors, including the researcher, emailed recruitment solicitations to their students. At the start of the Fall 2015 semester, the instructors emailed a short message inviting their students to participate in the study. Students who agreed were instructed to use an embedded link in

the email that redirected them to Qualtrics where they could link to the survey.

Participants were instructed to complete the pre-survey and the ToOLS instrument immediately. As an incentive to complete the post-survey at the end of the semester, the researcher offered to enter all participants who completed all three parts of the survey in a drawing to win $250 at the end of the term. As an added incentive, the researcher offered students of his asynchronous online courses PLSI 200-13 and PLSI 200-18 extra credit worth 5% of their final grade for completing all three parts of the survey. The survey responses were collected and stored in the researcher's Qualtrics account.

Data Analysis Approaches

Data were analyzed using two parallel approaches: a categorical approach using contingency table analysis and a measurement approach using ordinary least-squares regression. The contingency table analysis was done for consistency with Kerr et al. (2006). Likewise, the cut point between high and low scores was calculated along the median. Pearson's chi-squared analysis was run for each cross tab to test for significance. The analyses were also run via regression between raw OLS scores and final course grade. This more robust but parallel analysis yielded the same outcomes. All analyses were done using SPSS.

Descriptive statistics were run on student perceptions of how the ToOLS instrument helped them prepare for their online course. Cross-tabulations were used to analyze the relationship between variables of race, age, gender, and time spent on course-to-course grades and student attitudes about using ToOLS.

ToOLS Validity

The authors of ToOLS, Kerr, Rynearson, and Kerr (2006), published a validation study of the instrument wherein they described how they constructed it, how they conducted three separate validation studies, and how their research concluded that ToOLS did in fact accurately measure online readiness and predict student success in online courses. The ToOLS assessment instrument has been used widely and for many years with consistent results. After three years of empirical investigation, the developers found that it was a reliable measure of online student readiness. Specifically, a simple and stable structure, construct and criterion validity, internal reliability, and test-retest reliability were established. However, the predictive validity of the ToOLS instrument was not found to be particularly strong. When researchers conducted analyses on a subset of the sample for whom end-of-course grades were collected (N=56), they found that of the five subscales, only the Academic Skills subscale was a significant contributor to predicting student course performance (β=.312, p=.019) and that stepwise selection demonstrated that Academic Skills predicted only 9% of the variance in end-of-course grades (Kerr et al., 2006).

Limitations of the Study

Students enrolled in courses taught by the researcher accounted for 92% of the sample, which introduced researcher bias into the sample. The researcher maintained careful discretion over his role as instructor, making sure that students knew that there was no grade penalty for opting out of participating in the study and that the study was

truly optional and not part of coursework.

The pre-survey and post-survey were both untested and un-validated instruments. They were created by the researcher with advice from Professors Donohue, Beatty, and Kelly. However, the instruments were not tested for their structure and construct validity before use in this study. It could not be determined that pre- and post-surveys reliably captured the data that they were designed to collect. As a consequence, the data may not have the validity needed for comparison with ToOLS's scores and may have rendered cross-tab findings that were not an accurate reflection of the phenomena being studied The sample was not randomly selected from all SF State Fall 2015 asynchronous online undergraduate courses and does not represent the entire population. The sample was self-selected from five undergraduate asynchronous online courses. Two courses were taught by the researcher. Therefore, findings from this study can not be generalized to the entire population of asynchronous online undergraduate students at SF State.

Grading across SF State undergraduate asynchronous online courses was not standardized and therefore varied substantially across subjects. The lack of grading standardization across disciplines was not accounted for in this study since only three disciplines—Political Science, Business and Education—were included.

The researcher offered enticements to his course students to increase participation in the study including entry into a drawing for $250. Additionally, the researcher offered extra credit worth up to 5% of the final grade for students enrolled in PLSI 200-13 and PLSI 200-18 to increase participation. As a consequence, participation from those two

courses accounted for 92% of the sample, creating a selection bias. The researcher addressed the possible grade inflation in those two courses due to participation in the study by removing the extra credit awarded before statistical data analysis.

RESEARCH FINDINGS

Data analyses of the pre-survey, the ToOLS assessment, and the post-survey revealed no evidence that ToOLS accurately predicted students' success in asynchronous online undergraduate courses at SF State. In the final analysis, ToOLS was not supported as a predictor of online course success. However, the post-survey revealed several significant findings about students' attitudes and perceptions towards the value of ToOLS to help them prepare or complete their online courses.

Pre-Survey Findings

Results of the pre-survey provided the demographic data previously reported in Table 5. There were nearly twice as many women as men (65% to 35%) in the sample (see Table 8). Asian Americans and Caucasians comprised a little more than half (52%) of those who participated in the study. Almost three-quarters (74.9%) of the students were younger than age 22. Nearly three-quarters (74.2%) of the students had taken an asynchronous online course previously.

Table 8.

Pre-Survey Demographics of Online Student Sample (N=166)

Gender	**Percent**
Male	35.0
Female	65.0
Race	**Percent**
Caucasian	22.8
Latino/a	17.3
African American	5.6
Asian American	29.6
Native American	0.6
Other	24.1
Age	**Percent**
18-19 years old	35.6
20-21 years old	39.3
22-23 years old	10.4
Over 24 years old	14.7
Prior Online Courses	**Percent**
0	25.8
1	33.1
2	16.6
3	14.1
4 or more	10.4

ToOLS Assessment Findings

Students' Overall Learning Success scores and subscale scores were collected in Qualtrics, and the data imported into SPSS along with the pre- and post-survey data and end-of-course grades. Regression analyses were performed with the combined dataset to evaluate the predictive validity of ToOLS.

ToOLS Internal Reliability

In order to assess ToOLS' internal reliability, the researcher examined the distribution of ToOLS OLS and five subscale scores and found no abnormalities in the

distribution (Figure 6). The Cronbach alpha was found to be .65 and within normal distribution range. ToOLS yielded a robust and reliable quantitative score ranging from 112 to 216 points, with a mean score of 171.6 (s=19.7). This finding confirmed the finding of Kerr et al. (2006) that ToOLS demonstrated high internal reliability with alphas ranging from .63 to.84.

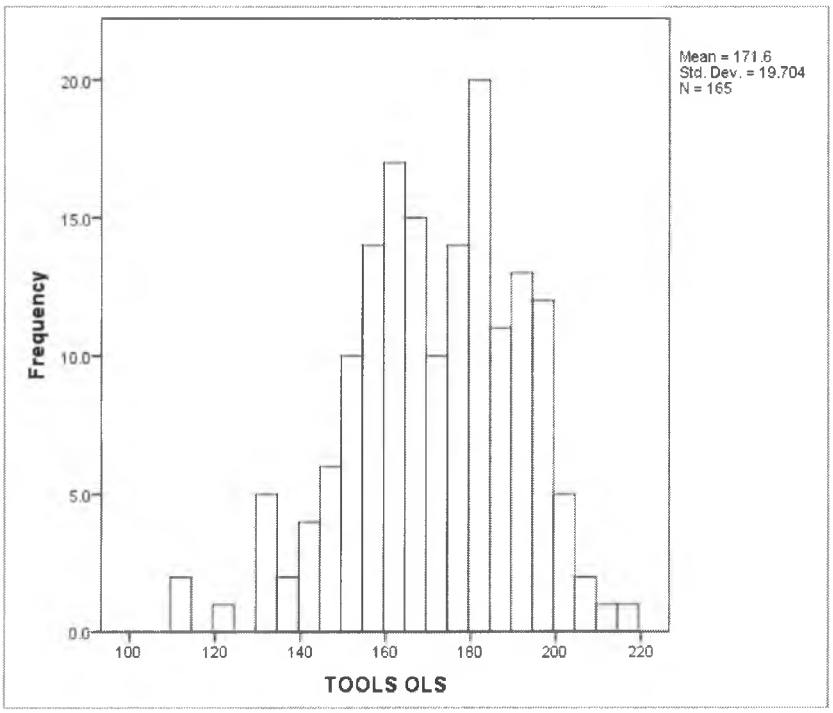

Figure 6. Distribution of ToOLS scores.

Grade Distribution Analysis

Analysis of how end-of-course grades were distributed found that the distribution was heavily skewed. A ceiling effect, not uncommon in course grade distributions in undergraduate courses, threw off the mean. An analysis of drop out and failure amongst

study participants from two sections of PLSI 200 which received ToOLS found that a total of 12 students received failing grades of D, F or No Credit and only two students received a Withdrawal or Incomplete grade.

It is important to recognize that the skewed grade distribution yielded no significant differences in the analysis of ToOLS' predictive validity. The regression analyses presented in Table 9 were verified using a log transformation of the dependent variable meaning that one unit change in the independent variable resulted in the respective regression coefficient change in the expected value of the dependent variable.

Regression Analysis of ToOLS as a Predictor of Course Grade

Table 9.

Nested Regressions Predicting Course Grade with ToOLS OLS

Model	β of ToOLS OLS	p value	Additional variables	R^2
A	.003	.579	None	.002
B	.003	.549	A + gender	.003
C	.003	.637	B + race	.037
D	.002	.690	C + age	.041
E	.002	.710	D + previous online course	.045

Table 9 presents the results of a nested series of regressions looking at how well OLS predicted course grade. Model A shows the simple bivariate model with OLS as the lone independent variable. As shown, the coefficient is .003, meaning that a one-point increase in OLS is associated with a .003 increase in course grade. The coefficient of determination (R^2) echoes this finding, showing that OLS only predicted 0.2% of variability in course grade. As we see in Table 9, OLS failed to predict course grade.

Potential in the OLS Results

The question was posed if OLS could be more successful in predicting outcomes among particular subsets of students. Gender, for example, could have interacted with OLS to make it a more powerful predictor of course grade. Model B showed gender incorporated into the analysis. As can be seen, gender did not increase the predictive value of OLS; the coefficient remained .003. It also did little to increase the predictive value of the entire regression (R^2 = .003).

Race was evaluated for interaction with the OLS to assess if it was a predictor of course grade. Model C incorporated race into the analysis. While the addition of race did increase the (R^2 = .037), that was not due to the OLS since the coefficient remained the same at .003. Next, age was evaluated to assess if it increased the predictive value of the OLS as shown in Model D. The researcher found that the addition of age actually increased the R^2 to .041; however, there was a corresponding drop in the coefficient making it even smaller at .002. This meant that while the predictive value of the entire regression increased slightly with the introduction of age, the corresponding drop in coefficient showed that the OLS was even less of a factor in the prediction of final grade. Finally, Model E incorporated prior online experience into the analysis and, again it was found that while the R^2 increased to .045, the coefficient remained .002.

Contingency Table Analysis of ToOLS as a Predictor of Course Grade

In order to account for the lack of grading standardization across asynchronous online undergraduate courses and the fact that course grades can be heavily skewed in

some courses as shown in Figure 7, Kerr et al (2006) used a contingency table approach in their validation study. This approach was successful in controlling for heavily skewed grading distribution. Since the researcher found a similarly skewed grade distribution at SF State, the choice was made to mirror the contingency table approach for consistency, which showed the same overall conclusions in the regression analysis seen in Table 9.

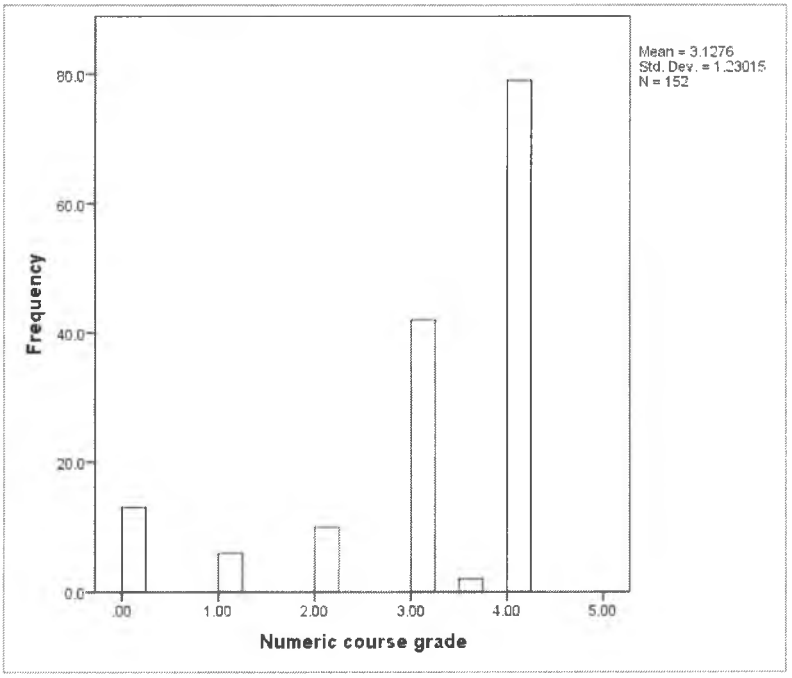

Figure 7. Distribution of grades.

Following the Kerr et al. approach, the five subscales were dichotomized into *high* and *low* scores based on median splits. Each scale was tested against the course grade with contingency analysis results as shown in Table 10. The results showed almost no association between course grade and any ToOLS subscale. This was repeated with a combined score of all subsets with similar results.

Table 10.

Contingency Table Results for Subscales

TOOLS Subscale	X^2	*df*	*p*
Computer skills	12.00	8	.15
Independent learning	5.53	8	.70
Dependent learning	8.46	8	.39
Academic skills	9.21	8	.33
Need for online learning	9.00	8	.34

These bivariate results (subscale scores and end-of-course grades) were examined separately controlling for gender, race, age, and prior online course experience. Because of the sample size, each control variable was considered alone rather than in combination. Had the sample been larger and had there been larger representation in each group, it would have been possible to combine control variables to explore how they affected the results. None of the ToOLS subscales were significant in predicting course grade across all cases.

Comparison of TOOLS Subsample with Control Group

The researcher compared a subsample comprised of two sections of Fall 2015 PLSI 200 (sections 13 and 18), which received ToOLS, to a control group of two Spring 2015 sections of PLSI 200 (sections 4 and 5), which did not. There were no significant differences in final course grades. This finding confirmed that the introduction of ToOLS did not have a significant effect on final course grades.

Post-Survey Findings on Student Attitudes

After the students completed ToOLS, they completed the post-survey, which

asked a battery of questions including two about students' feelings about using ToOLS. The responses provided the data necessary to answer research question 2.

Figure 8 shows that three-quarters of students felt that an assessment like ToOLS would be helpful to other students considering taking an asynchronous online course. Only 6% who took the ToOLS assessment disagreed. The majority of students believed ToOLS was helpful to them; however, the concept of "helpful" was not elaborated.

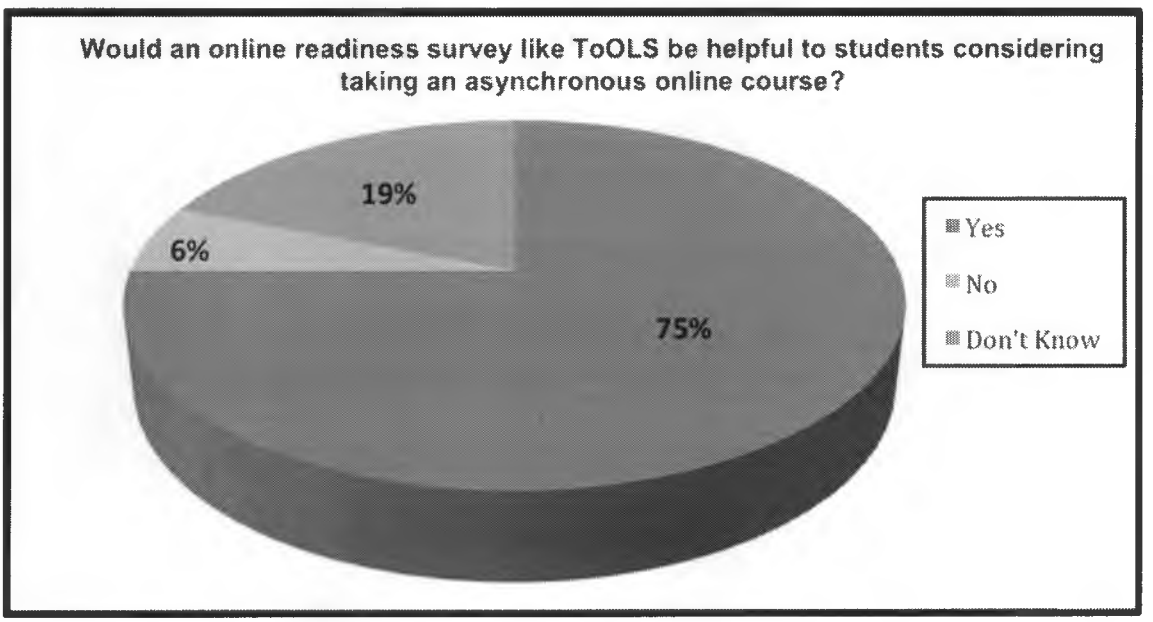

Figure 8. Post-survey on helpfulness of ToOLS.

When the same questions were analyzed by ethnicity (Figure 9), 60% of Whites found ToOLS helpful compared to 80.8% of Asian Americans, African Americans, Native Americans and Latino/a populations who reported that tools was helpful. This finding suggests that ToOLS might prove helpful for several student groups and may have future value in providing guidance to students in preparing for their online courses.

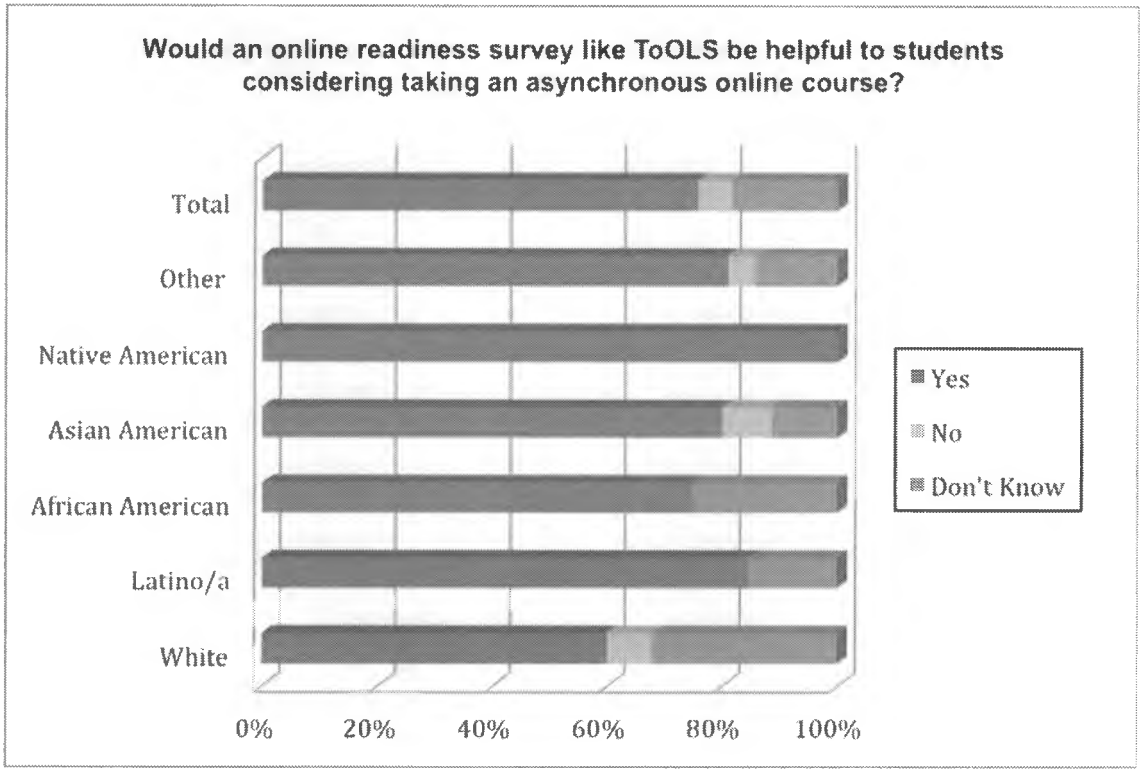

Figure 9. Post-survey on helpfulness of TOOLS by ethnicity.

Over half of students' responses indicated that ToOLS helped them increase self-awareness enough to successfully complete an online course and 40% of responses indicated that ToOLS instilled confidence to help them persist and complete their course. Figure 10 (note that this is a multi-answered question) illustrates that almost a quarter (24%) of the responses indicated that ToOLS pointed out student weaknesses and provided motivation for students to seek extra help so that they could complete the online course. However, 33% of responses indicated that ToOLS was not helpful.

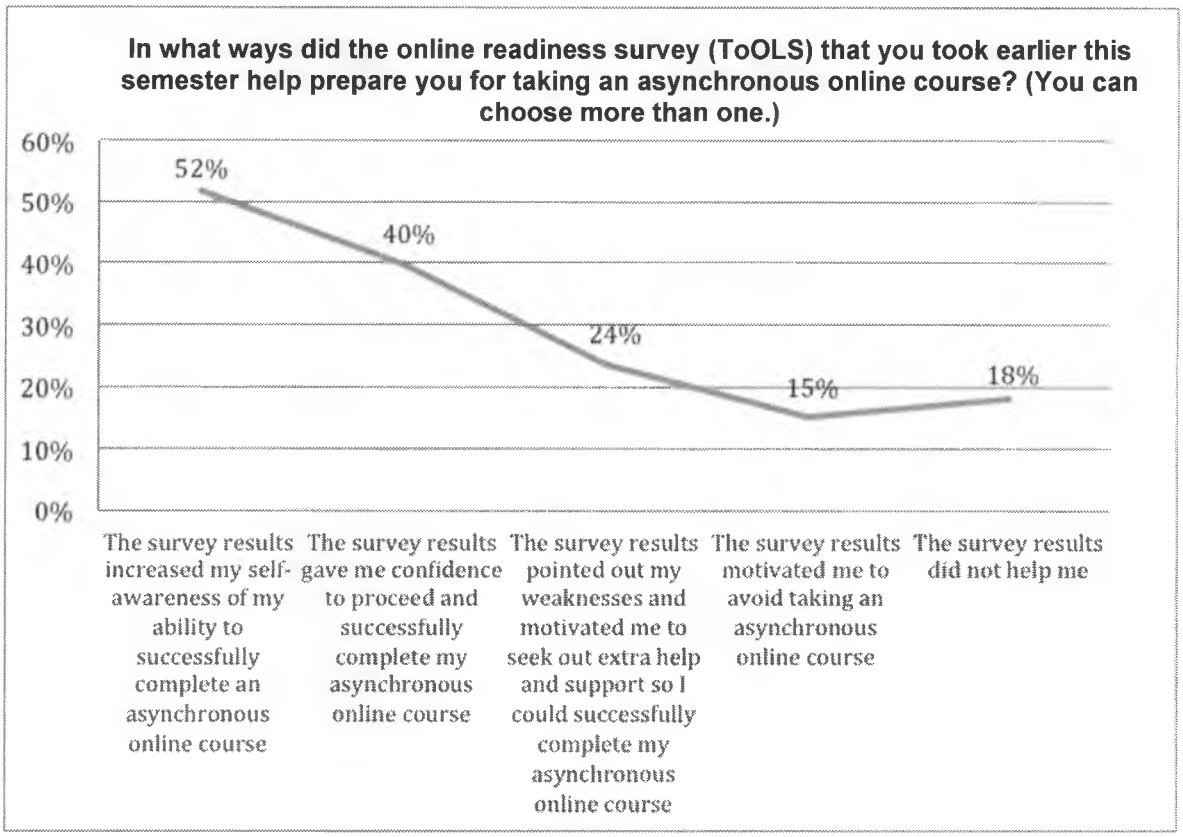

Figure 10. Students' differing perceptions of ToOLS' usefulness.

Summary of Findings

The findings revealed that TOOLS could not be used to predict online course success in these courses at SF State. The researcher used a nested regression analysis to show that the OLS did not have predictive value even when combined with gender, race, age, or prior online experience. In addition, the researcher mirrored the Kerr et al. (2006) ToOLS validation study using a contingency study approach that corroborated that ToOLS did not have predictive value. The OLS and all five subscales were found to be ineffective predictors of student performance using the final asynchronous online

undergraduate course grades.

Although the instrument did not show predictive value, the researcher found that students reported that the ToOLS assessment could potentially be helpful. In the post-survey, 75% of the responses indicated that ToOLS would be helpful to students considering taking an asynchronous online course. Among the non-Caucasian students, that percentage was higher. Of particular interest when considering the equity implications of this study was the fact that 80% of Asian American responses, 81% of African American responses and 85% of Latino/a responses indicated that students believed that ToOLS would be helpful compared to responses from Caucasian peers.

When asked about ways in which they found ToOLS helpful, over half of the responses from participants reported that the instrument helped them increase their self-awareness and 40% of the responses said that ToOLS provided them confidence to persist and complete the online course. Additionally, 24% of responses reported that the assessment motivated students to find extra help to successfully complete the online course. However, there was no evidence that these students actually did seek extra help. Even though this study could not validate ToOLS as effective for predicting student success in online courses at SF State, some students nevertheless found the instrument to be of value for them in their course.

CONCLUSIONS AND RECOMMENDATIONS

This study addressed an issue which has arisen from the expansive growth in online courses at SF State, in the CSU system, and nationally. This issue is the lack of student preparedness when taking asynchronous online courses, especially non-White students for whom dropout and failure rates are higher in online courses than in traditional classroom-based courses. Earlier chapters outlined how the CSU has worked to meet the emerging needs of its growing online student population by developing CSU Fully Online as a central web-portal for online course registration, and creating QOLT certification standards to help faculty redesign and deliver their courses online. Additionally, the CSU has provided online readiness assessments free of charge to all students within the system to make it possible for them to determine if they are ready to take an online course. This study chose to look at this last approach and chose to evaluate the assessment known as ToOLS because of its potential impact and the lack of research on the efficacy of the available online readiness assessments in the CSU.

Two facts were noted at the beginning of this study: 1) the online readiness assessments available in the CSU had not been significantly researched, and 2) these assessments held promise for detecting students at risk for an asynchronous online course prior to enrollment.

SF State is currently in a position to learn from what other CSU campuses have been doing to help students self-assess their readiness to complete online courses successfully. This study showed that many CSU campuses make online readiness assessments available to their students, and have begun to integrate these instruments into their student support systems. Current uses of these assessments include:

- CSU Stanislaus directs students to complete an online readiness assessment before they register for an online course. Stanislaus also offers fully online tutoring and advisory services for their online students so that they do not have to travel to campus for support.
- CSU Chico provides a campus-hosted webpage that features ToOLS, advice for taking an online course and links to fully online support services that follow up on the ToOLS assessment reports. CSU Chico has also designed a webpage around ToOLS so that students can assess their readiness for online learning and access online supports to address identified weaknesses.
- CSU East Bay offers e-tutoring and online writing lab services that provide individualized student counseling and support services entirely online. CSU East Bay also offers twenty-four hour, seven-days a week fully online technical support to help students in their online learning.
- CSU Fullerton prominently displays its online readiness assessment instrument and online student supports on the university website so that visitors can easily find and access them.

This study identified the fact that SF State has not made any of these assessments available to its online students as peer campuses have done. However SF State is positioned to learn from other CSU campus experiences and develop its own comprehensive plan to meet the unique needs of its online student population. SF State has a highly diverse student population, as noted in the study, with 74.5 percent non-White students (per Table 5). It has a history for a high standard of social justice as part of its mission. If the university could find solutions to address and support its at-risk students, it could begin to meet its mission by expanding students' success rates in online courses, thereby raising its graduation rates.

This was a limited study that looked at a promising online readiness assessment known as ToOLS to evaluate if it could predict students' success in online courses and identify its value as a possible addition to SF State. While the study achieved its goal, it found conclusively that ToOLS had no predictive value for SF State undergraduate students in online asynchronous courses. It also exposed an institutional need for more research, planning and foresight in the way SF State responds to the needs of online students.

Discussion on the Research Questions

This study confirmed that there was no predictive validity for the ToOLS instrument (Research Question 1). However, both this study and the original Kerr et al. study (2006) had limited samples, leading to several recommendations below for further research.

The study found that the majority of students thought an online readiness assessment might prove helpful when considering an online course, while 18% said they did not find ToOLS helpful (Research Question 2). These findings raised questions about the usefulness of online readiness assessments and their application in supporting students' needs in asynchronous online courses.

The failure to demonstrate predictive validity on course performance also raised questions on the validity of the other ToOLS sub-scale scores. The data revealed that almost three-quarters of the students reported ToOLS might be helpful. Over half of all students in the sample reported that ToOLS increased their self-awareness, and 40% reported that it gave them confidence to successfully complete the online course.

The study raised equity implications for asynchronous online courses that suggested further research would be imperative. Two obvious outcomes from taking the ToOLS assessment were questionable for all students, especially for students of color: 1) Were students who scored high on ToOLS (especially students of color) led to believe they would succeed in the online course when, in fact, they might have been better advised to take a face-to-face course? 2) Conversely, did students who scored poorly on ToOLS decide not to take the online course when, in fact, they might have performed well in the course?

ToOLS may not effectively predict student success in online courses, but a third question raised by the study was whether it could be valuable to students in other ways. ToOLS might be useful as a diagnostic instrument to encourage students to modify their

behavior as they progressed through an asynchronous online course. It may be useful as a personal catalyst for inspiring struggling students to seek additional help and support. One last question is whether alternative ways exist to meet these same goals.

Recommendations for SF State

Given what is now known from the study, two leadership policy questions arose: 1) Should institutions consider using online readiness assessments; and 2) How should institutions apply ToOLS or any other online readiness assessments? Related to whether institutions should encourage the use of readiness assessments as a matter of policy is the issue of the appearance of such encouragement by placing them at the forefront on institutions' home pages or on the CSU's web pages. Decisions cannot be made regarding the impact of these assessments on students until more definitive knowledge is gained.

SF State's diverse student population suggests that researchers may want to look specifically at non-White students' perceptions of ToOLS and its potential helpfulness in several areas. A larger sample from these groups, drawn from disciplines representative of the breadth of online undergraduate courses offered by SF State, may yield important insight into the usefulness of the instrument as a student self-diagnostic and self-awareness aid.

Findings from this research may also uncover new applications for ToOLS that could address several issues of equity in online courses pointed out by the study, such as in areas of: retention, persistence, grades, technological preparedness, and online learning behaviors. In reporting the findings, it was noted that Kaupp (2012) in his study of

community college students had found that the Latino-White achievement gap, as measured by average grade, was increased in the online environment compared to face-to-face classes. Perhaps ToOLS may be helpful to Latino/a online students to offset the online penalty. Additionally, African American students who were found (Xu & Jaggars, 2014) to experience additional barriers to success in online courses may find ToOLS valuable as a self-diagnostic assessment. High student dropout and failure rates in online courses, especially for students of color, suggests that there should be closer monitoring and assessment of student dropout and failure rates in SF State's online courses. It would be equally helpful to track and research causes of non-completion.

The study finding that 40% of participants reported that ToOLS helped them have more confidence suggested that it, or a similar instrument may be applied to support positive cognitive characteristics that have been found (as Morris et al. (2005) showed) to contribute to student success in online learning. Additional knowledge would be needed on what students perceive as the values to using ToOLS or other online readiness assessments, and on how they believe such assessments might help them in their performance in online courses.

SF State should examine examples from other CSU campuses and current research from similar institutions to discover promising approaches that might better address dropout and failure, and prepare the University to offer an effective student support system. The collective work of faculty, students and administrators in

developing a comprehensive plan to support online students would bolster SF State's program of online education and show students workable paths to success.

Final Thoughts

This study suggested the need to develop better ways to advise students who are considering taking an asynchronous online course. As SF State is now poised to expand further into online education, the University has an opportunity to fully engage the entire campus community including students, faculty, governance bodies and other key stakeholders in developing a comprehensive approach to online education. Fully online tutoring support for students enrolled in online courses, training and preparation for online instructors, and resources to help students make informed choices about enrolling in online courses all need to be part of a comprehensive plan for online education. It is essential that the planning process begin as soon as possible.

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Appendix A. Pre-Survey Instrument

Q1. Please enter your email address here
Q2. Please enter your student ID number here
Q3. What is the name of your instructor?
Q4. What is the name of your asynchronous 100% online course?
Q5. What is the course number of your asynchronous 100% online course?
Q6. What is your first name?
Q7. What is your last name?
Q8. What is your gender?
Male (1) Female (2)
Q9 Please specify your ethnicity?
White (1) Latino/a (2) African American (3) Asian American (4) Native American (5) Other (6)
Q10. What is your age?
18-19 years old (1) 20-21 years old (2) 22-23 years old (3)
over 24 years old (4)
Q11. Is English your second language?
Yes (1) No (2)
Q12. Are you a foreign student?
Yes (1) No (2)
Q13. Which of these best describes your current enrollment status?
Full-time student (1) Part-time student (2)
Q14. Are you a single parent or guardian of a child in your household?
Yes (1) No (2)
Q15 Are you the first in your family to go to college?
Yes (1) No (2)
Q16 How many semesters have you been a student in higher education?
1-2 (1) 3-5 (2) 6-10 (3) 10-15 (4) more than 15 (5)
Q17. What device do you use to access your asynchronous online course(s) on a regular basis?
SFSU-owned desktop/laptop computer on campus (1)
Your own personal desktop/laptop computer (2)
Your smart phone (3)
Your ipad or other tablet device (4)
Other (5)
Q18. How fast is your internet connection?
Faster than I need to fully access my online course and complete my work in a timely manner (1)
Fast enough to fully access my online course and complete my work in a timely manner (2)
Slower than I need to fully access my online course and complete my work in a timely manner (3)
Too slow to fully access my online course and complete my work in a timely manner (4)

I don't know (5)

Q19 How many hours per week can you realistically devote to accessing and completing coursework in this for credit 100% asynchronous online course?

Less than 1 hour (1) 1-2 hours (2) 3-4 hours (3) 5-6 hours (4) 8 or more hours (5)

Q15 How many for credit 100% asynchronous online college-level courses have you taken before this one?

0 (1) 1 (2) 2 (3) 3 (4) 4 or more (5)

Q16 If you have taken one or more for credit 100% asynchronous online course(s) prior to this one, what grade did you get in your highest performing course?

Completed the course with A or better (1)
Completed the course with B or better (2)
Completed the course with C or better (3)
Completed the course with D or better (4)
Completed the course with Pass (5)
Dropped the course before completion (6)
Failed the course (7)

Q17 What grade did you receive in your lowest performing for-credit 100% asynchronous online course?

Completed the course with A or better (1)
Completed the course with B or better (2)
Completed the course with C or better (3)
Completed the course with D or better (4)
Completed the course with Pass (5)
Dropped the course before completion (6)
Failed the course (7)

Q18 Have you ever repeated a for-credit 100% asynchronous online course?

Yes (1) No (2)

Q19 If you answered yes to the previous question, please tell us why you repeated the for-credit 100% asynchronous online course.

Q20 How many units are you taking in total this semester?

Less than 12 units (1) More than 12 units but less than 16 units (2) More than 16 units (3) More than 20 units (4)

Q21 What was your motivation for taking this for credit 100% asynchronous online course?

To qualify for financial aid (1)
It was a prerequisite for another course (2)
For student visa or other related immigration issue. (3)
It was a graduation requirement I needed to satisfy (4)
To fulfill my concentration requirement (5)
For fun/personal interest (6)

Appendix B. ToOLS Questions

A. Computer Skills (55 points; 10 questions)

1. I am capable of learning new technologies
2. I am capable of sending and receiving e-mail
3. I am capable of attaching files to an e-mail message.
4. I am a 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.

B. Independent Learning (50 points; 10 questions): Note item 14 is reverse scored.

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.

C. Need for Online Learning (25 points; 5 questions)

22. Because of my personal schedule, I need online courses.
23. It is difficult for me to go to campus to complete course requirements.
24. I need online courses because of my geographical distance from universities.
25. I need online courses because of my work schedule.
26. I need the freedom of completing coursework at the time and place of my choosing.

D. Dependent Learning (30 points; 6 questions)

27. I often leave tasks unfinished.
28. I require help to understand written instructions.
29. I wait until the last minute to work on assignments.
30. I have trouble comprehending what I read.
31. I need faculty to remind me of assignment due dates.
32. I need incentives/rewards to motivate me to complete a task.

E. Academic Skills (65 points; 13 questions): Note items 36 and 37 are reverse scored.

33. I can learn by working independently.
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 C. Post-Survey Instrument

Q1. Please enter your email address here
Q2. Please enter your student ID number here
Q3. Please enter your first name here
Q4. Please enter your last name here
Q5. In what ways did your online instructor help you adjust to the online learning environment of your course? (You can choose more than one)

I received an orientation to online learning at the start of the class (1)
I was asked to take an online readiness survey to help identify areas where I needed extra help (2)
I was given strategies for online success (3)
I was given advice on how to adapt from a face to face class to a 100% asynchronous online course (4)
I needed more help to adjust to the online learning environment (5)
Contacts and online resources for student supports were provided (6)

Q6. In what ways did the online readiness survey (TOOLS) that you took earlier this semester help prepare you for taking an asynchronous online course? (You can choose more than one)

The survey results increased my self-awareness of my ability to successfully complete an asynchronous online course (1)
The survey results gave me confidence to proceed and successfully complete my asynchronous online course (2)
The survey results pointed out my weaknesses and motivated me to seek out extra help and support so I could successfully complete my asynchronous online course (3)
The survey results motivated me to avoid taking an asynchronous online course (4)
The survey results did not help me (5)

Q7. In your opinion, would an online readiness survey like TOOLS be helpful to students considering taking an asynchronous online course?

Yes (1)
No (2)
Don't know (3)

Q8. Which of these best describes how responsive your instructor was to your emails and inquiries?

Very responsive -s/he got back to me immediately (1)
Somewhat responsive - s/he got back to me by the next day (2)
Not very responsive - s/he got back to me a few days after I made a request or inquiry (3)
Not responsive - s/he rarely if ever responded to my questions or emails (4)

Q9. Which of these did your asynchronous online course require? Please select all that apply.

Watch weekly/daily video lecture by your instructor (1)
Post to forums (2)
Quizzes and exams (3)
Essays or short essay assignments (4)
Group work with your classmates (5)
Other (6)

Q10. Please rank the helpfulness of the following to your learning of the course content and progress in the asynchronous online course.

_____ Video lecture by instructor (1)
_____ Collaborative peer work (2)
_____ Videos not by instructor (3)
_____ Forums (4)
_____ Polls (5)
_____ Readings (6)

Q11. Which of the following resources did you use when you needed help in your asynchronous online course? Select all that apply.

Instructor office hours (1)
Campus tutor (2)
Academic technology advisor (3)
Other online resource (4)
Email instructor (5)
Asking other students in the class for help (6)
None (7)

Q12. To what extent did you interact with your peers online?

Frequently (several times a day) (1)
Daily (once a day) (2)
Regularly (several times a week) (3)
Occasionally (a few times over the course of the semester (4)
Never (5)

Q13. How much time did you set aside each week to do work in this course?

1-2 hours (1)
3-4 hours (2)
4-5 hours (3)
6-7 hours (4)
More than 8 hours (5)

Q14. How accurate was your original estimate of the time you needed to devote to doing the work required by this course in order to achieve the grade you desired?

Accurate - it was what I expected (1)
Somewhat accurate - it was more or less work than I expected (2)
Not accurate - it was completely different than what I expected (3)

Q15. To the best of your knowledge, what final course grade do you expect for the asynchronous online course you took this semester?

A or better (1)
B or better (2)
C or better (3)
D or better (4)
F (5)
Passed (6)
Failed (7)
Incomplete (8)

Appendix D. ToOLS Score Report

Advice to Students

Proceed with caution: Your score suggests that you may need additional support to help you succeed in an asynchronous 100% online course. Some helpful advice: Keep an electronic calendar of assignment due dates that sends audible reminders (alarms),Establish rapport with a classmate quickly and obtain his/her feedback on assignments Discuss any learning needs you may have with your course instructor early to obtain additional support and guidance if necessary

Take some notes: Your score suggests that you should consider seeking additional information and assistance to help you succeed in a asynchronous 100% online course. You may benefit from specific skills building to improve your performance and achieve a higher grade. Skills such as reading comprehension, writing and time management can be strengthened with the assistance of tutors and specific exercises.

Ready to go: Well done. You scored in the top half (50th 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, you should consider working with a peer to support each other's progress.

More than prepared for online learning: Individuals who score between 202 and 225 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.

Appendix E. Recruitment Email to Online Students

Is online education at San Francisco State meeting your needs? Here is your chance to tell us.

This email is to invite you to participate in a study to understand the relationship between online readiness and student success in online courses. All you have to do is take a brief three-part online survey with one part given at different times over the next 3 months. The combined survey will take approximately 20-30 minutes of your time in total and findings from your responses will give us valuable insight into what you as an online student need and may help improve the way online courses are delivered. As thanks for your assistance, you will be automatically entered into a drawing for a chance to win a $250 gift certificate.

Directions

1. Click the link here https://sfsu.co1.qualtrics.com/SE/?SID=SV_0dKlQPZhYN7R1lj to be taken to Part I of the survey. It will take 5-10 minutes for your to complete.
2. Approximately 7 days later, you will be emailed a link to Part II. This survey will also take about 5-10 minutes to complete.
3. Approximately 90 days later, you will be emailed a link to Part III. This final survey will also take 5-10 minutes to complete.

After you have completed all three parts of the survey, you will be automatically entered into a drawing to win a $250 gift certificate. The winner will be announced at the end of the Fall semester. Results of the study can be made available to you upon request.

Please do not forward this link https://sfsu.co1.qualtrics.com/SE/?SID=SV_0dKlQPZhYN7R1lj to anyone else. This survey link is for you only.

Appendix F. Email to Online Instructors

Text of Email

9/8/15

Dear Professors,

Thank you all for your help in recruiting participants for my study researching the relationship between online readiness and student success in for credit asynchronous 100% online courses offered by San Francisco State University. I would ask that you forward the participant recruitment letter with survey link below to your students. Any help you can provide me in encouraging your students to participate would be greatly appreciated. I will be happy to share the findings of the study with you when completed. Thank you again for your help and support.

Regards,

David Lee
Doctoral Student, SFSU

Attachment: Text of Participant Recruitment Letter