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TURN ON *COMPLETION TRACKING*: THE EFFECTS OF A PERSONAL

PROGRESS-MONITORING TOOL ON ACADEMIC ACHIEVEMENT AND

PERSISTENCE IN AN ONLINE LEARNING ENVIRONMENT

by

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Committee Approval

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In loving memory of my husband, Dr. Robert M. Wood (1976-2014)

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Abstract

Universal Design for Learning (UDL) principles and Self-Directed Learning (SDL) theories provided the foundation for this research study. This study sought to isolate a specific course design element available in a learning management system (LMS) that an instructor could easily implement, for student achievement performance or persistence, with little direct instruction required. Completion Tracking, a check-box performance aid, was the LMS tool examined by this study. The results indicated the tool alone was not a significant factor in either achievement performance or persistence. However, female students were more likely to use the tool as were students in the online course.

A population considered in this study were individuals underprepared for college coursework. The term underprepared included the categories of remediation, presence of a disability, and English as a second language (ESL). Self-reported disability and English as a second language negatively affected performance, as measured by total points. Disability was also associated with lower SDL skills. Students considered underprepared may need additional supports or different instructional strategies to be successful in university coursework (Hanover Research, 2013).

CHAPTER I:

Introduction

Many individuals who are enrolled in college courses struggle to complete the

term with adequate academic performance, dropping courses in which they are doing

poorly. Higher education faculty have a variety of strategies and tools they call upon to

support student performance and persistence. Performance aids are one category of tools

that are available to faculty within learning management systems, but specific

performance aids and their effect on student performance and persistence have not been

extensively researched. *Completion Tracking* is a checklist tool, embedded in the Moodle

Learning Management System, which allows students to monitor personally the progress

made in a course. Personal progress monitoring is supported by the Universal Design for

Learning (UDL) framework ("CAST timeline: One mission, many innovations, 1984-

2010," n.d.) and Self-Directed Learning theory (Song & Hill, 2007). This framework and

theory both have independent, successful learners at their center. To identify independent

and successful learners calls attention to the opposite: learners who are dependent or

unsuccessful. In the university setting, there are students accepted and enrolled who are

not ready for the independent learning (self-directed learning) required by postsecondary

course work, which is seen in the need for remedial coursework. These students are

underprepared for the rigors of college, in part, because they have low self-directedness,

which includes personal progress-monitoring skills. Research in the K12 setting has

shown students who monitor their own progress perform more consistently (Bahr, Fuchs,

Fuchs, Fernstrom, & Stecker, 1993; Dalton, Martella, & Marchand-Martella, 1999; Mace,

Belfiore, & Shea, 1989). This study investigated the relationship of a personal progress-

monitoring tool, *Completion Tracking,* with performance and persistence of undergraduates in a general education class, as well as the correlation of self-reported "underpreparedness" with measures of self-directedness.

Research Context

The landscape of today's workforce constantly changes with ongoing advancements in technology (Partnership for 21st Century Skills, 2008). Employers look for both content knowledge (hard skills) and dispositions (soft skills) of future employees. "Soft skills" are underlying attributes and mindsets of individuals including such qualities as professionalism, reliability, the ability to plan and think strategically, self-confidence, information and communication technology skills, good self-management and time-management skills, and a willingness to learn and accept responsibility (Andrews & Higson, 2008, p 413).

The employability of college graduates is an essential outcome of postsecondary education. The primary focus of course work is to teach content-specific knowledge; however, students should also learn the critical soft skills employers have identified, which should have transferability from one content area to another (Andrews & Higson, 2008).

In the fields of education and psychology, the soft skills include the concepts known as executive functioning, self-regulation, and self-direction. In an education setting, such as college, students bring their combined personal attributes (resource-use, strategy-use, motivation) and autonomous processes (planning, monitoring, evaluating) to the classroom. It is incumbent upon the instructor to provide a learning context designed with resources, structure, and tasks, coupled with support, to achieve the desired learning

outcomes (Song & Hill, 2007). Thus, instructors not only provide a learning context for students to acquire and practice content knowledge, but also to acquire and practice strategic and goal-directed skills (Meyer, Rose & Gordon, 2014). Employers attempt to design a similarly supportive environment with the use of performance aids, such as manuals, process flowcharts, checklists, and dashboard indicators (Allan, 2015), many of the same aids used in a classroom.

As the workforce requirements shift to more informational and technical computer skills, higher education moves to support students as they return to college for a new career or enter college with the prospects of beginning a career (Hilliard, 2013; Thomas, 1983). This move is evidenced by the increased offerings of online courses: "the number of students taking at least one online course increased by over 411,000 to a new total of 7.1 million…[t]he proportion of higher education students taking at least one online course is at an all-time high of 33.5 percent" (Allen & Seaman, 2014, p. 4). Online courses allow students to continue working while attending school (Jaggars, 2011; Jaggars & Xu, 2010).

Online Learning in Higher Education. As the number of online course offerings increase, higher education leaders have a 68.9% agreement rate on the following: students need tenacity and discipline to complete online courses (Allen & Seaman, 2015). A United States Department of Education report on online learning (2009) suggests online instruction can be as effective as face-to-face instruction, a finding also supported by academic leaders in the field (Allen & Seaman, 2014, 2015; Gaytan & McEwen, 2007). Upon a deeper look at the US Department of Education report (2009), the courses reviewed were hybrid courses, which include both face-to-face and online components.

While online instruction can be effective, the report does not delineate who finds online instruction to be effective. Isolating characteristics of online learners that would correlate to increased success may be difficult, but there is evidence that academically struggling students have less success than peers who do not struggle academically (Hanover Research, 2013; Jaggars & Xu, 2010).

The lack of academic success in online courses by students who struggle academically underscores a challenge that community colleges and universities have faced for a number of years – "remedial" or "developmental" coursework for admitted students who were deficient in foundational knowledge (The Landscape, 1999; U.S. Department of Education, 2012). Underprepared students may lack content knowledge for a variety of reasons, including disability, English language acquisition challenges, family obligations, or career change (Barbatis, 2010; Jaggars & Xu, 2010; Jaggars, 2011; Miller & Lu, 2003; Ruderman, 2013; Tierney & Garcia, 2008). In addition to the deficit of content knowledge, accompanying self-directed skills may also be weak. A review of the *Top 20 Principles for Psychology for PreK-12 Teaching and Learning* indicates "soft skills," or self-directed skills, can be taught to students, but require opportunities for practice in multiple, contextual environments. Perhaps underprepared students have not had adequate practice in multiple environments. The 20 principles also point out that student mindsets and teacher expectations affect learning outcomes (American Psychological Association, Coalition for Psychology in Schools and Education, 2015).

Hanover Research (2013) reported the following:

Oftentimes, underprepared learners enter courses or programs without the "self-directed skill set" necessary to succeed in the online learning environment. Self-

discipline, time management, the ability to work independently, and the planning

skills necessary to complete assignments and projects on time are all critical for

success in online learning, which requires a high level of initiative and

responsibility (p. 18).

Hanover Research and others (Jantz, 2010; Xu & Jaggars, 2013) concur

underprepared students are lacking in the soft skills (self-directed skill set) necessary to be

academically successful in both online and face-to-face learning environments. This

suggests underprepared students may not have mastered all of the how- to- learn skills in

high school, and those students who come back to college after being in the workforce

may or may not have learned the skills necessary to be a successful student from their

employment. Colleges often accept students with weaknesses in these areas because

"underprepared students in higher education have been linked with the ideals of

opportunity and access" (Mulvey, 2009, p. 30). The result is the increased need to support

these learners in developing the content knowledge and self-directed learning ("soft")

skills needed to be successful in the college classroom.

One skill associated with self-directedness, important in a learning context, is the

ability to monitor one's own progress in a course. This skill provides the opportunity for

students to record what they have completed and is a type of behavior that helps students

to keep pace with course requirements. Studies in the K-12 setting have shown students

who were taught to chart their own behavior performed more reliably in their classwork or

behavior (Bahr, Fuchs, Fuchs, Fernstrom, & Stecker, 1993; Dalton, Martella, &

Marchand-Martella, 1999; Mace, Belfiore, & Shea, 1989). A small study of students (n =

7) in a developmental college course used a checklist prompt successfully to guide them in developing effective study skills (Gilbertson, Mecham, Mickelson, & Wilhelmsen, 2010).

Aside from providing remedial coursework to build skills and knowledge (The Landscape, 1999), some postsecondary institutions use a bridge program to help with the transition from high school to college for qualified students (Hall, 2011). A bridge program is a course or workshop often held in the summer to help students transition from high school to their post-secondary education. Other institutions may provide a one-semester study skills course to reteach the self-directed skills students may lack (Bail, Zhang, & Tachiyama, 2008; Cukras, 2006); provide academic advising; or foster online learning communities (Miller & Murray, 2014; Miller & Lu, 2003; Stewart & Scappaticci, 2005). Institutions have seen mixed results and have various levels of sustainability over time (Edgecombe, 2011; Miller, 2003; Tierney, 2008). The previous approaches focused on an institutional level (e.g., study skills course, advising, and community) rather than the course level. To date, instructional strategies at the course level or self-directed skills an instructor might incorporate into the curriculum have not been examined across content areas. In other words, the skills explicitly taught and practiced in a study-skills course may not be reinforced when students take mainstream, general education courses. Learning is contextual and must be supported in different environments for transfer and generalization (American Psychological Association, Coalition for Psychology in Schools and Education, 2015). It becomes incumbent upon faculty to provide scaffolding for students to practice and develop self-directed skills in all courses, not just remedial courses in math and English. One way to deliver support is through course design and the utilization of tools in a learning management system (LMS). Through intentional and consistent design, faculty

can provide a learning environment that meets the various needs of learners in their courses (Meyer, Rose & Gordon, 2014). The identification of specific, easy to implement strategies that reinforce desirable self-directed skills in various types of coursework can be a challenge for instructors. Research based on self-directed learning and UDL principles may help identify specific, effective instructional strategies for online learning contexts to enhance students' self-directed learning characteristics and, by extension, persistence and performance.

LMS Design. The guiding principles of curriculum design for the research reported herein are grounded in UDL ("CAST timeline: One mission, many innovations, 1984-2010," n.d.). Song and Hill's (2007) model of SDL provides a lens to consider student characteristics and the impact of the learning context on the learner. The primary overlap between UDL and SDL of interest to this study is personal progress management. Providing students with the ability to monitor their own progress should reinforce SDL skills in this learning context. *Completion Tracking* is a learning management system-embedded tool, by which students manually track their own progress of completed assignments and activities within a course.

Universal Design for Learning (UDL). Universal Design for Learning uses principles of universal design first conceptualized for accessibility in architecture and now aligned with current education research in neuroscience. The focus of UDL is on designing the learning environment to be responsive to the various strengths, needs, and interests a learner may bring to the experience (Meyer, Rose & Gordon, 2014). Neuroscience research emphasizes the need to design flexible learning environments and curricula with multiple pathways for both receiving information and expressing

knowledge of that information (Meyer, Rose & Gordon, 2014). The framework for UDL

provides instructors with a path to support and develop learners to become resourceful,

knowledgeable, goal-directed, strategic, purposeful, and motivated. The primary goal of

UDL is to help learners become both knowledgeable and self-directed through the

conscious design of supportive learning contexts (Meyer, Rose & Gordon, 2014).

Figure 1. Universal Design for Learning Guidelines 2.0 Reprinted with permission from
www.cast.org.

UDL guidelines are comprised of three principles (Figure 1; Center for Applied

Special Technology, 2011). The first principle is *multiple means of representation*; the

second is *multiple means of action and expression* and the third principle is *multiple*

means of engagement. Each principle is comprised of three additional guidelines. The

structure of the guidelines moves in a vertical progression. Each guideline builds to the

next, leading the teacher and learner to a more student-centered learning environment with

multiple means of accessing the curriculum, engaging with the curriculum, and expressing the content learned. The arrows directing the movement down the chart illustrate this progression. In all, UDL supports the development of self-directed learners through the principles and guidelines of the framework (Appendix A).

Multiple means of representation focuses on the construction of knowledge by the learner as they recognize patterns, symbolic representations of information, and assimilate that information for later use (Meyer, Rose & Gordon, 2014, p. 54).

Multiple means of engagement considers the impact of motivation and interest in the learning situation. The most abstract guideline of this principle, but the one most relevant to this study, is to provide options for self-regulation by promoting the individual's self-directed learning skills and strategies. "Self-regulation is the ability to set motivating goals; to sustain effort toward meeting those goals; and to monitor the balance between internal resources and external demands, seeking help or adjusting one's own expectations and strategies as needed" (Meyer, Rose & Gordon, 2014, p. 52). The challenge is to create a learning context that develops personal coping skills and strategies, as well as the ability to self-assess and reflect on the learning process. This construct is in line with Bandura's (1993) self-efficacy model, which argues the confidence a student (learner) feels with respect to regulating their own learning and performing in academic tasks tied to the belief of that student in the following areas: aspirations, level of motivation, and academic accomplishment (p. 1). The focus is on the affective nature of engagement and ability of an individual to regulate their attitudes and behaviors toward the learning process (Meyer, Rose & Gordon, 2014, p. 52).

Multiple means of action and expression suggests a learner develops goal-directed and strategic skills when provided opportunities to use executive functioning skills. Executive functioning skills are demonstrated when a learner is given a problem, assignment, or multi-step task. The creation and implementation of a strategic plan for approaching the challenge is the evidence of executive functioning. The learner must take into account constraints such as time, resources, or skill and apply appropriate strategies to fulfill the challenge. Thus, the learner must make decisions in both taking action and expressing her solutions for the task. Taking self-regulation (ability) and executive functioning (performance) together, a self-regulated learner is purposeful and motivated, as expressed through executive functioning skills which include planning, strategy development, managing information, and the communication of the learning thereof (Meyer, Rose & Gordon, 2014, p. 55).

Self-Directed Learning (SDL). The autonomous processes of SDL (planning, monitoring, and evaluating individual learning processes) which include executive functioning and self-regulation are embedded in the UDL framework guidelines. Additionally, the design of the learning context is comprised of resources, structure, and the nature of the tasks which has an influence on the SDL experience of the learner (Song & Hill, 2007). Self-directed learning and self-regulated learning are terms used interchangeably throughout the literature (Bracey, 2010), with SDL appearing more frequently in the context of online or web-based learning. The characteristics of SDL include both personal attributes (Candy & Brookfield, 1991; Hiemstra & Brockett, 2012; Song & Hill, 2007) and autonomous executive functioning skills (Finley, 2014; Garner, 2009; Zimmerman, 1990, 2002), including the ability to monitor one's own progress. All

are influenced by the learning environment. Personal attributes include resource use,

strategy use, and motivation (Brockett & Hiemstra, 1991; Song & Hill, 2007), while

planning, monitoring, and evaluating are the autonomous processes (executive functioning

skills). Personal attributes and autonomous processes are two characteristics, impacted by

the design and support of the learning context (Song & Hill, 2007, see Appendix A for the

illustrated model). SDL skills can be supported through instructional design (Cennamo &

Ross, 2000; Nikitenko, 2011; Väljataga & Laanpere, 2010); however external supports

directed by the teacher should begin to fade as the learner takes over the strategic planning

within the learning context and becomes an expert learner (Ertmer & Newby, 1996). One

measure of SDL is the PRO-SDLS (Stockdale, 2003), a survey based on the Personal

Responsibility Orientation to Self-Directed Learning model (Brockett & Hiemstra, 1991).

Another model of self-regulated learning in elearning is comprised of stages and

processes that lead to the accomplishment of a task (Rowe & Raffery, 2013). The

processes are comprised of cognitive, metacognitive, and motivational elements. Each

process follows a four-stage sequence of planning and goal setting, self-monitoring,

controlling, and reflecting. This model aligns with the autonomous executive functioning

skills of SDL.

Persistence, and achievement, especially in online environments, are series of

characteristics correlated with low readiness for underprepared students. The

characteristics often associated with underprepared students are low-income (Jaggars,

2011), first-generation (Mulvey, 2009), ethnically diverse (Barbatis, 2010), and

disabilities (Gregg, 2007; Mulvey, 2009). The most common characteristic of

underpreparedness is the need for remedial coursework (math or English, Jaggars & Xu,

2010). None of the published research, however, has demonstrated a correlation between characteristics of underpreparedness and measures of self-directedness.

Personal Progress-Monitoring (PPM). Embedded in self-monitoring is the idea of personal progress-monitoring (PPM), specifically related to the identification of benchmarks to reach an end-goal. The business world illustrates this concept through performance aids to help employees become familiar with job procedures and to monitor job performance (Watkins & Leigh, 2010). In essence, the performance aid structures the environment to support the subject's executive functioning skills. Examples of performance aids in the area of PPM are templates, dashboards, rubrics, and checklists (Cicerone, Levin, Malec, Stuss, & Whyte, 2006; Ganz, 2008; Higbee & Goff, 2008; Allan, 2015). Within each of these categories are multiple examples of tools that can facilitate job performance.

Just as an instructor may provide hints, feedback, verbal explanation of learning strategies, checklists, or other supports to guide a learner to develop skills (Van Merriënboer, Kirschner, & Kester, 2003), the checklist serves as a visual cue to students of the tasks that need to be accomplished; thus, personal progress-monitoring. As students mark off their lists, it can be motivating to see all boxes checked (Nunes & Drèze, 2006). Professionals in fields such as medicine, construction, and aeronautics use the checklist as a PPM to create simplicity and validation in complex tasks (Gawande & Lloyd, 2010).

"Self-monitoring has been proven to be effective with individuals of all ages and abilities" (Ganz, 2008, p. 46). Self-monitoring, or PPM, is a subset of the executive functioning skills seen in SDL that is a teachable strategy at all levels of ability (Cennamo

& Ross, 2000; Ganz, 2008; Zimmerman & Martinez-Pons, 1990) and a support strategy
that can be embedded in the learning context by the instructor (Song & Hill, 2007).

To apply the concept of PPM and performance aids to higher education,
Completion Tracking is one example of a tool in the checklist category, easily developed
into the design of any course that uses Moodle, a Learning Management System (LMS).
When *Completion Tracking* is activated, the instructor can make each element of the
course appear with a checkbox to be marked automatically by the system when conditions
are met or manually by the student. An example of a conditional mark is an element
automatically checked off after the learner receives a grade on an assignment. Learners
can use *Completion Tracking* to monitor their personal progress with course readings,
activities, and assessments.

Completion Tracking is an instructional design tool that gives the learner control
over their personal progress-monitoring. Supported by research and practice in both
education and the business world, a checklist is a simple strategy that empowers the
student (Allan, 2015; Dymond et al., 2006; Ganz, 2008; Van Merriënboer et al., 2003)

Figure 2 illustrates the relationship of Self-Directed Learning and PPM to the UDL
Guideline 6: Executive Functioning. Garrison (2003) describes SDL as influenced by both
motivation and the management of the learning process. UDL recognizes the motivation
component of self-regulation (see guideline 9), which is a personal attribute a learner
brings to the learning environment. The SDL model proposed by Song and Hill (2007)
recognizes both the personal attributes [resource use, strategy use, and motivation
(Brockett & Hiemstra, 1991; Song & Hill, 2007)] and self-monitoring skills needed for
success in a learning experience. Self-monitoring is closely related to metacognition

(Dinsmore, Alexander, & Loughlin, 2008; Dixon & Dixon, 2010; Schraw & Moshman,

1995); executive functioning (Finley, 2014; Garner, 2009); and self-regulating behaviors

(Cukras, 2006; Dinsmore et al., 2008; Finley, 2014; Zimmerman, 1990, 2002).

Organization, planning, task analysis, comprehension, goal-setting, facilitating

information – these are all aspects of self-monitoring behaviors (Meyer, Rose & Gordon,

2014).
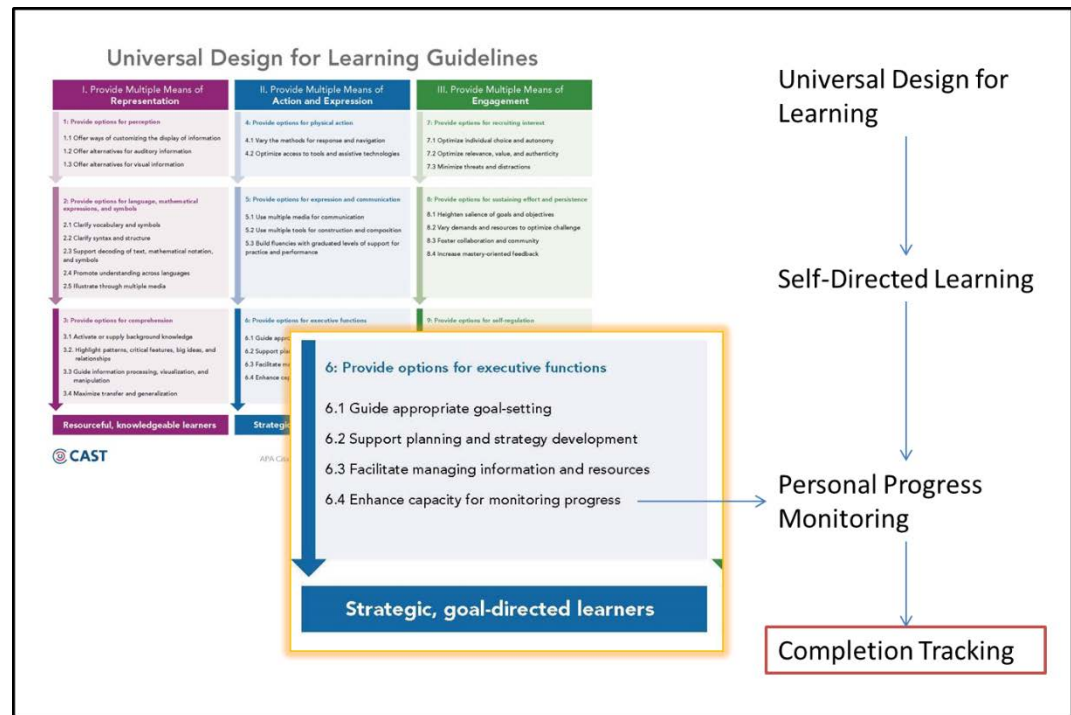
Figure 2. The conceptual connection between Universal Design for Learning and Self-Directed Learning.

The current emerging literature investigates learner control and its relationship to

the development of self-directed learners (Chou & Liu, 2005; Saw, 2011; Väljataga &

Laanpere, 2010; Wolff, Wood-Kustanowitz, & Ashkenazi, 2014). An aspect of learner

control is the opportunity to monitor one's own progress.

Problem Statement

The number of online courses in higher education is increasing (Allen & Seaman, 2015) across all disciplines whether they be remedial, general education, or program specific (Jaggars & Xu, 2011), which means the number of online students is also increasing. The range of students who enroll in higher education courses includes prepared traditionally aged students (ages 18-21), underprepared traditional students (ages 18-21), prepared non-traditional students (age 22+), and underprepared non-traditional students (age 22+) (Buerck, Malmstrom, & Peppers, 2003; Jaggars & Xu, 2010; Xu & Jaggars, 2013; Yu, Digangi, Jannasch-Pennell, & Kaprolet, 2008). As the range of student characteristics increases, identifying specific strategies or tools to help all students, especially those who struggle the most, becomes ever more important.

Successful online learners are characterized by the ability to self-direct their own online learning (Allen & Seaman, 2014; Smittle, 2003), which includes the ability to assess one's own progress towards a goal (Chou & Liu, 2005; Magno, 2012; Väljataga & Laanpere, 2010). The self-assessment may be an external reference point - a performance aid - used as a PPM tool. The problem is research-based strategies are few, especially those that specifically address both UDL and SDL principles. Therefore, additional research is needed into tools and strategies that may help all students in accordance to UDL principles. A call to investigate whether strategies that support a student's PPM effect student success and persistence has been made (Hart, 2012; Kuh, Kinzie, Buckley et al., 2006).

Purpose of the Study

The purpose of this study was to examine the relationship between the use of a personal progress-monitoring tool and both student academic performance and persistence. This study also attempted to validate the empirical relationship between preparedness, using demographic indicators identified by previous research, and self-directedness, as measured by an SDL survey. By investigating use of a specific personal progress-monitoring tool (*Completion Tracking*), the research examined the interplay of student characteristics, student use of *Completion Tracking*, and student levels of self-directed learning.

Research Questions

In the research questions developed for this study, self-directedness was measured by the PRO-SDLS (Stockdale, 2003) and preparedness was measured by a self-report of three factors (3-Factor Questionnaire): English as a first language (Martirosyan, Hwang, & Wanjohi, 2015), need for remedial coursework (Jaggars & Xu, 2010), and disability (Hanover Research, 2013; Mulvey, 2009).

1. Is there a significant relationship between the percentage of *Completion Tracking* usage and percentage of total points achieved by undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

2. Is there a significant relationship between the percentage of *Completion Tracking* usage and persistence in the course, measured by taking the scheduled final exam, or the date of last login, by undergraduate students in a freshman anthropology

course after controlling for the following factors: remediation self-report, English as a

primary language self-report, disability self-report, self-directedness, and course delivery?

    3. Is there an association between preparedness, as indicated by a self-report of

remediation, and self-directedness, as measured by the PRO-SDLS?

Research Design
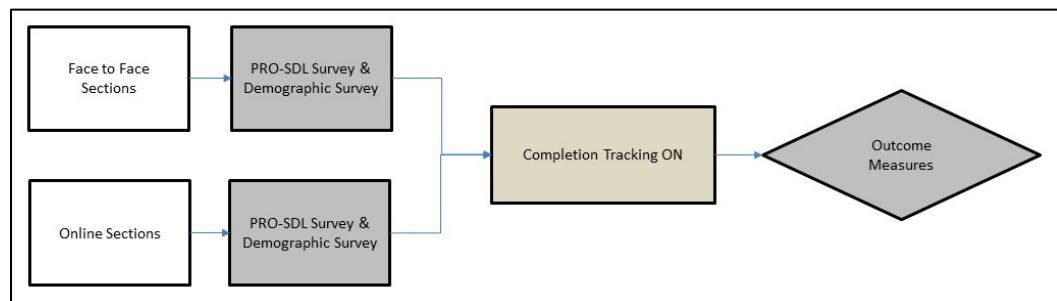
Figure 3. Correlational design flowchart

    Figure 3 illustrates the flow of the correlational research design. One online section

of ANTH 1100 and two face-to-face, lecture-style sections participated in the research; all

sections were taught by the same instructor, using the same course materials, and in the

same semester. This is an introductory Anthropology course; all course sections use

Moodle to submit and track assignments. No discussion forums were required in either the

face-to-face or the online courses. The interaction between instructor and students in the

online section was minimal while the face-to-face course was a lecture-style. The

researcher presented the 25-question Personal Responsibility Orientation to Self-Direction

in Learning (PRO-SDL) survey (Stockdale, 2003) and a 3-Factor Questionnaire to all

participants. Participants were identified as High, Medium, or Low SDL levels for

statistical comparisons. Data from the three-factor questionnaire and the university's

Office of Institutional Research provided information on the participants in terms of

known characteristics of underpreparedness (Barbatis, 2010; Jaggars, 2011; Mulvey,

2009; Ruderman, 2013). Participation in the study began during the third week of the term with students completing the PRO-SDL. Throughout the semester, students were encouraged to participate in the study by completing the PRO-SDL and the informed consent; however, students were not informed of the exact purpose of the study. Although the *Completion Tracking* tool was always available for all sections, the instructor of the course gave no extra attention to the *Completion Tracking* tool.

Figure 4 illustrates the relationship between the control variables and dependent variables, and related data to be collected. All sections of ANTH 1100 received the treatment condition. Remediation, language, disability, and self-directedness were the primary control variables for analysis. Two measures of success were included: final course grades measured by the percentage of total points earned; and persistence rates measured by the percentage of the class that was completed, indicated by the last login date (taking the final exam was 100% course completion).
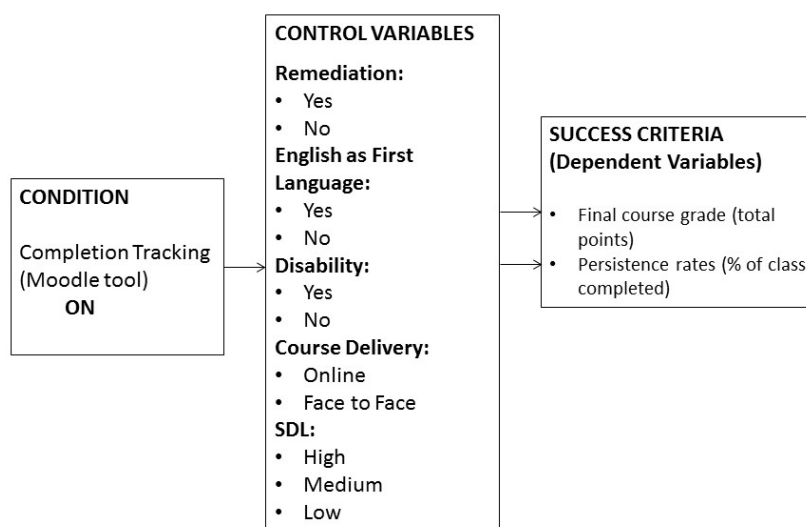
Figure 4. Treatment model including control variables and success criteria.

Limitations

Limitations are threats to internal validity, which may have adversely influenced the results of the research. Of twelve threats to internal validity identified by Campbell, Stanley, and Gage (1963), five potential threats were identified for closer examination although it was determined that two of them (maturation, instrumentation) did not apply and two others (history, and experimental mortality) had no effect. Selection may have an influence on the results of the research.

History. Specific events, other than the treatment, that occur during the study may be a threat to the internal validity of the study. During this study, racial profiling and hate crimes occurred toward the middle of the semester during which time some students were reportedly fearful leaving their homes to attend class. In this study, 66% of the participants were international students with the majority members of the group targeted in the alleged hate crimes. No international students participating in the study stopped attending class nor had a change in their individual performance before, or after the events occurred. After university administration provided directions for acceptable accommodations and in consultation with the instructor, it was determined this study was not affected by the external events.

Maturation. Defined by Campbell, Stanley, & Gage, (1963), maturation is the growth and development of respondents due to the passage of time. This study was conducted over a 16-week semester with adult learners. This period would show significant growth in young learners; however, since all study participants were adults over 18, individual maturation is not a factor.

Instrumentation. A threat to internal validity due to instrumentation may be due to design contamination. This occurs when participants discover the research objective and respond differently, biasing the results (Bracht & Glass, 1968). To reduce this threat, participants only see the survey title *PRO-SDLS*. This does not alert students to the measured construct, self-directedness. Thus, instrumentation does not apply as a threat to internal validity.

Selection. This study was also limited to students who take ANTH 1100. They may not reflect all students at the university since there were other options to fulfill this general education requirement, including ECON 1100 *Economic* Issues, HIST 1102 *Modern Europe,* EDUC 1110 *Education and Schooling in the U.S.*, and ten other courses. Two selection factors are relevant to this study: 1. Students with other options chose to enroll in ANTH 1100 to fulfill general education requirements and 2. The self-selection of students who chose to opt in to the study. These factors may threaten internal validity as those who selected ANTH 1100 because of an interest in the subject are then internally motivated to do well and to persist. Additionally, students who agree to participate in the study may be students motivated by a grade. Contingent extra credit was awarded for participation rates reaching the 80% threshold. No further effort was made to control for possible selection effects, future research should consider this as a possible area of study.

Experimental Mortality. A significant threat to internal validity in some studies is the mortality rate of participants once the data collection process has begun. While mortality is a threat to every study, persistence rate was a research question posed to investigate the relationship between persistence and use of *Completion Tracking*. Moodle collected the date of last login to determine how many days participants remained actively

involved in the course, unless they took the final exam, in which case, they completed 100% of the course.

Delimitations

Delimitations refer to constraints placed upon a study by the researcher that may limit external validity and define the parameters of the study. Bracht and Glass (1968) identify two main categories of validity: population validity and ecological validity.

Population Validity. Population validity refers to the extent to which the study is generalizable back to the target population. In this study, the accessible population consists of the students enrolled in the online and face-to-face sections of ANTH 1100 taught by a single instructor during a single semester. This course fulfills a general education requirement at the undergraduate level and each section of the course has approximately 80 students. The demographics of the ANTH 1100 course were not a proportional representation of the university as a whole. Over the last six semesters, the institution has averaged 53% female undergraduates, while only 39% of ANTH 1100 students were female. Additionally, 71% of the student body is Caucasian and 11% is nonresident alien (international students), while in ANTH 1100, 44% were Caucasian and 42% were international students. Lastly, on average, 6% of the student body over the past three semesters have enrolled in a remedial course, while 38% of ANTH 1100 students have enrolled in a remedial course. Based on participation rates, 80% of the students enrolled in ANTH 1100 allowed their data to be included in this study. This allows the generalization of results to the general ANTH 1100 population, and possibly all underclassmen (freshmen and sophomores). The disparity between the university and

ANTH 1100 for "remediation" may threaten generalizability, but "remediation" was a characteristic of interest for the study.

      Ecological Validity. The conditions of the study may constrain the ecological validity of the findings. The choice to use the PRO-SDLS as a pretest was at the discretion of the researcher, and as this study looked at *Completion Tracking* specifically, the findings may not apply to other forms of PPMs or performance aids.

      The initial assessment instrument, PRO-SDLS (2003) has 25 items and uses a Likert scale of 1 – 5. This survey was validated by subject matter experts (Stockdale, 2003) and has been used in a number of research projects (Fogerson, 2005; Hall, 2011; Holt, 2011) to identify self-directedness in learning as indicated by the teacher-learner transaction and the characteristics of the learner according to the Personal Responsibility Orientation to Self-Directed Learning model (Brockett & Hiemstra, 1991). This tool was chosen because it has been validated and permission was granted for use in this study. A different measure of SDL may have impacted the final categorization of high, medium, and low.

      The outcome measures were descriptive of the total number of points and the persistence rate. Point totals on assessments or in a course are a common measure of achievement as these points are used to assign grades (Haak et al, 2011; Jaggars & Xu, 2011). Taking the final exam marks a completion of the course or 100% persistence. Using the date of the last login, if the final was not taken, allows a calculation of how long the student persisted. This model of persistence clearly indicates how much of the course was completed.

The generalizability of this may have been affected by the selection of the

assessment tool PRO-SDL (Stockdale & Brockett, 2011; Stockdale, 2003), and what it

purports to measure. This tool measures SDL in the constructs of initiative, self-efficacy,

control, and motivation. There was a possibility these constructs are not the most effective

measures of SDL. Another measure of self-directed learning, the "Self-Directed Learning

Readiness Scale" (Guglielmino, 1977) was considered, but dismissed based on cost and a

question of the validity of the instrument (Field, 1989; Bonham, 1991). Bonham (1991)

concluded the "Self-Directed Learning Readiness Scale" only identified those who liked

to learn and those who did not. The four constructs of the PRO-SDLS have not received

the same heavy-handed critique and was determined to be an appropriate instrument for

this study.

Definitions

Completion Tracking **(CT).** Moodle is the learning management system (LMS)

used by the institution to manage online course information, activities, and assessments

for face-to-face classes and to offer online courses. *Completion Tracking* is a personal

progress-monitoring aid available in Moodle with visibility controlled by the instructor.

Completion Tracking is a feature built into Moodle under the "Activity Completion"

setting in the Administration block that "allows the teacher to set completion criteria in a

specific activity's settings." A check (tick) appears against the activity when the student

meets this criterion (see Figure 5). The criterion might be viewing or receiving a certain

score, or a student may manually mark the activity as complete (Activity Completion,

2015, para. 1-2). For the purposes of this study, students manually marked all activities;

therefore, *Completion Tracking* is defined as a Moodle feature by which students may

record completion of an online activity or assignment. Although *Completion Tracking* was available to all students in ANTH 1100, this feature was voluntary by nature, so a student might complete an activity but not check the box. It became incumbent upon the individual student to mark progress in the course.
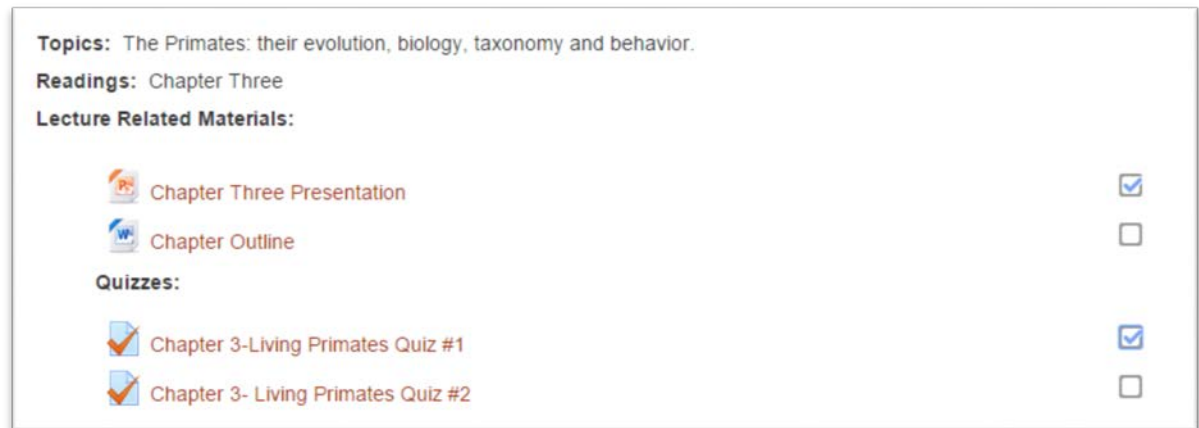
Figure 5. Image of *Completion Tracking* in Moodle with checkboxes

Online Course. An online course meets either synchronously or asynchronously through the Internet. Students and teacher do not meet for class in person (Allen & Seaman, 2014; Means, Toyama, Murphy, Bakia, & Jones, 2010). For the purposes of this study, the asynchronous sections of ANTH 1100 by the same instructor were considered an online course. The face-to-face sections, while having Moodle course webpages identical to the online sections, were not online courses.

Persistence. An online learner accesses a course over the duration of the academic term has shown persistence. A persistent student may not have the highest point total, but the student participates through the end of the course. In this study, persistence is 100% for taking the scheduled final exam. A persistence rate less than 100% is a calculation

based on the last date a student logged into the course and the total number of days. This definition was appropriate given the design and structure of the course.

Personal Progress-Monitoring (PPM). PPM is the systematic record of one's own work towards accomplishing a goal. Metacognition, cognitive skills, and task processes are necessary for PPM in a course. The focus of this study was on the defined practice of tracking course progress using *Completion Tracking* in Moodle. While other aspects of PPM may be germane, such as evaluating one's own mastery of the content, they were not a focus of this study. PPM was operationalized in this study by recording the percentage of boxes checked out of the total possible number.

Self-Directed Learning (SDL). Many terms appear in the literature that refer to the ability of an individual learner to demonstrate responsibility for his or her learning. SDL is seen as both a piece of the learning process and characteristic of the learner (Candy & Brookfield, 1991; Fogerson, 2005; Song & Hill, 2007), and was measured by the PRO-SDLS in this study. The PRO-SDLS (Stockdale, 2003) evaluates four factors within two components: initiative and control (teaching-learning transaction component), self-efficiency and motivation (learner characteristics component).

Underprepared Student. An umbrella term, an underprepared student is defined as a student who has been accepted into postsecondary education, but is not academically prepared for the rigors of college coursework, either content knowledge or self-directed skills. A student may be underprepared for various reasons including disability, English language skills, or the need to remediate (Mulvey, 2009). Academic underpreparation has been often identified by a placement exam, which serves as a gatekeeper for progress in a university education (Bettinger & Long, 2009). The student who performs poorly on the

placement exam is frequently required to take a remedial course in either math or English, or both, before admission to a degree-seeking program (Hanover Research, 2013; Jaggars & Xu, 2010, 2010; Jantz, 2010). For the purpose of this study, an underprepared student is one who was required to take a remedial math or English course before admittance into entry-level undergraduate coursework, have the presence of a disability, or has a primary language other than English (identified as a self-report factor). Enrollment in undergraduate coursework should indicate the student has acquired some of the necessary skills and knowledge for general education studies, but does not change the fact they began college underprepared. The expectation was students would all score similarly in the PRO-SDLS as they matriculated into general education coursework.

Significance of the Study

The United States Department of Education released a meta-analysis in 2009 (Means et al., 2010) that compared evidence-based practices in adult online learning. The report indicated some tools used to support online learners were effective. "The clearest recommendation for practice...is to incorporate mechanisms that promote student reflection on their level of understanding" (Means et al., 2010, p. 48). The recommendation supports additional research that explores the relationship between academic success and a high level of self-directed learning behavior (Chou & Chen, 2008; Jantz, 2010). However, very few replicative studies examined those tools in various contexts. This study contributes to the body of knowledge and to the current literature, as called for by Means et al., (2010), by examining the relationship between use of a specific tool (*Completion Tracking*) on student outcomes of persistence and achievement (Figure 4).

Online learners who are successful utilize self-directedness strategies more deliberately than peers not using appropriate SDL strategies (Deyo, Huynh, Rochester, Sturpe, & Kiser, 2011; Hanover Research, 2013; Langley & Bart, 2008; Nikitenko, 2011; Pachnowski & Jurczyk, 2000; Rovai, 2003). One area of SDL that has had limited research is practical: what strategies should instructors implement to aid the development of self-directedness (Horner & O'Connor, 2007)? This study investigated *Completion Tracking* as a personal progress-monitoring feature in Moodle, which aligns with key components of universal design and self-directed learning.

Jaggars and Xu (2010) and Jantz (2010) suggested the learning needs of underprepared students are not addressed in an online learning environment. A skill set these students may lack is the same skill set research indicates is most likely to predict their academic success: the learners' ability to act in a self-directed manner (Liu, Gomez, Khan, & Yen, 2007). Therefore, strategies, tools, and instruction that support development of these skills should also support academic success. However, there has been limited research on the effectiveness of self-direction tools and strategies generally, let alone of specific tools and their effects. The current study addressed this gap in the literature by examining whether a personal progress-monitoring tool (CT) might be an effective strategy for learners with various levels of self-directedness and preparedness.

As greater numbers of students enroll in online courses (Allen & Seaman, 2014, 2015), discovering and reporting ways to improve outcomes becomes more important. The implications of this study provide instructional designers and course instructors with a simple mechanism to support students' personal progress-monitoring and move toward the end goal of developing a self-directed learner (Candy & Brookfield, 1991; Meyer, Rose &

Gordon, 2014). The instructor controls the learning context through the instructional

supports woven into the design of a course (Song & Hill, 2007). Therefore, through course

design, integrating a PPM tool in support of self-directed learning may influence the

persistence of underprepared learners in all environments and increase academic success

of all learners.

CHAPTER II: Literature Review

Literature Review

Increasing numbers of underprepared students enter postsecondary education ill equipped for the rigors of college coursework (Jaggars & Xu, 2010; Xu & Jaggars, 2013). Academic underprepardness is related to previous educational experiences such as poor preparation or prior academic failure (Garcia & Vasquez, 2014; Miller & Murray, 2014). The scope of this research is to investigate whether the usage of a personal progress-monitoring tool is related to performance or persistence of prepared and underprepared students in both online and face-to-face settings.

An initial search was conducted with Google Scholar and followed with a search in EBSCO. The search was initially constrained to years 2004-2014. However, after reviewing the reference lists from relevant articles, additional sources were located from earlier years related to distance courses and technology. The exclusion criteria for this search were (a) articles unrelated to postsecondary education, (b) articles with no original data, or (c) not written in English.

The literature review consists of four themes pertaining to this study. The first section reviews research related to characteristics of successful online learners. The second section summarizes investigations of the preparedness of students relative to remediation, disability, and language, on the context of self-directed learning. The PRO-SDLS as a measure of self-directed learning is also addressed. The third section highlights executive functioning research, as well as personal progress-monitoring aids and tools from other fields. The final section discusses performance and persistence as measures of success. The chapter concludes with a summary of the literature.

Impact of Course Delivery Method

Online learning has been a recent option in the continuum of educational experiences. A great deal of research has gone into determining if the outcomes are the same for online and traditional face-to-face classes (Hanover Report, 2013; Means et al., 2010).

Characteristics of Successful Online Learners. Dabbagh (2007) identified several characteristics of successful online learners, including strong academic self-concept, fluency in the use of online learning technologies, possessing interpersonal and communication skills, understanding and valuing interaction and collaborative learning, exhibiting a need for affiliation, exhibiting self-directed learning skills, and possessing an internal locus of control. Fishman (2014) supports Dabbagh as evidenced by a study which examined the relationships between perceived academic control, student responsibility, and knowledge building. Fishman (2014) argued that students who felt capable of achieving academic success also felt an internal obligation to obtain the outcome. A student's sense of responsibility also influenced the relationship between perceptions of control and reported use of self-regulated behavior (Fishman, 2014).

Motivation. The online learner must self-motivate to learn while engaging in the learning process. A sample study of undergraduates ($n = 108$, 70% female, 77% white) in a Psychology program were randomly assigned to one of three versions of a lesson teaching HTML (Sansone, Fraughton, Zachary, Butner, & Heiner, 2011). This study measured self-regulation and motivation by the value of learning (goals-defined) and the interest of the material (experience-defined). Three different types of HTML learning goals formed the experimental conditions: neutral ($N = 37$), personal application ($N = 33$),

or an organizational application ($N = 35$). HTML was taught identically across the three lessons. During the session, students were not able to ask for content help from anyone, nor were they monitored for how they spent their time. This was to approximate the experience of the online learner. Analysis of the two Likert-scale questionnaires focused on value added on one measure and interest on the other measure. Results suggested individual interest in computers was important in terms of influencing students' expectations, particularly in the interaction between personal versus organizational value. Therefore, self-motivation was found to be a characteristic of successful online students.

Strategy Use. Strategies used in an online course by a student are potentially aligned to personal learning preferences. A study of graduate students ($N = 20$) in Canada focused on how the Myer-Briggs Type Indicator® concepts were related to students' strategy choices in the online environment (Dewar & Whittington, 2000). What resulted were qualitative comments about the experience (strategies to facilitate or hinder learning) and strategies developed to participate in the online environment for extraverts, introverts, and intuitive personalities. The researchers observed that both introverted and extraverted students found aspects of the online environment appealing. The strategies developed by those who were intuitive tended to focus on increasing their "sensing" skills, the trait opposite to "intuition" (p. 3).

Another study to look at student perceptions of useful and challenging characteristics of online courses surveyed graduated students ($N = 76$) who had taken at least one online course. Nine participants completed follow-up interviews. The data indicated course design (83%), comfort with online technology (78%), motivation (75%),

and time management (75%) were important to be successful in an online course (Song, Singleton, Hill, & Koh, 2004).

Successful online learners have different strategies they use depending on personal characteristics. Course design however plays the key role in student perceptions regarding a successful online learning experience. The literature does not address either the behavior or perceptions of undergraduates in their use of strategies holistically or specifically.

Preparedness of Students

Colleges and universities consider academic performance when making course-placement decisions for students. Generally, students are prepared and matriculate directly into undergraduate work. Some students must take remedial work first before they can continue their degree programs. These underprepared students have many resources allocated to identifying and supporting them (Bail, 2008; Miller & Murray, 2014; Mulvey, 2009).

Underprepared Students. While identifying behaviors of those who are successful students, examining personal characteristics that may create a barrier is also of value (Mulvey, 2009). The need for remediation in math or English, learning English as a second language, and the presence of a disability are three broad characteristics found to negatively influence academic success (Barbatis, 2010; Hanover Research, 2013; Jaggars & Xu, 2010; Mulvey, 2009).

Remediation. Bettinger and Long (2009) conducted a large predictive study to examine whether college remediation works for students. Using a data set ($N = 28,000$) from the Ohio Board of Regents, students were tracked in public colleges over 6 years. Equation modeling compared students who were not required to take remedial coursework

due to the policy of their attending institution to students required to take remedial courses of similar backgrounds and scores. Accounting for differences in remediation policies and the fact students tend to attend the closest campus to their home, the results suggest, "remediation has a positive impact on the college outcomes of underprepared students" (p. 739).

Another large study ($N = 28,389$) conducted with the Virginia Community College system tracked first-time students from 2004-2008 to analyze patterns of online course enrollment, retention and performance in online versus face-to-face courses for college-ready and underprepared students, and other educational outcomes for underprepared and college-ready students in online courses using multilevel modeling techniques. After controlling for various student and course-level factors, online course enrollment, and remedial status each had main effects on course performance. In terms of course completion, "underprepared students performed more poorly, and online students also performed more poorly, and thus a student in both categories performed most poorly" (p. 28). Finally, it was shown that students who took remedial courses online were less likely to advance to gatekeeper courses for entrance into their discipline of study (Courses, $N = 9,295$; English Face-to-Face, 74% completion; English Online, 48% completion; Math Face-to-Face, 53% completion; Online, 40% completion).

Disability. The most recent 2012 US Census data indicates nearly 20% of Americans have a disability (Bernstein, 2012), and the World Health Organization (2011) reported approximately 15% of the world population has a disability. To contextualize this in terms of postsecondary education, in the US Senate HELP Committee Hearing (2014), Senator Tom Harkin (D-IA) stated:

Postsecondary education is a primary goal for more than 80 percent of

high school students with disabilities. Sixty percent of young adults

with disabilities enroll in postsecondary education, compared to 67

percent of young adults without a disability. Among those who enroll in

college, 41 percent graduate, compared to 52 percent of those without

disabilities. We must better understand why students with disabilities

are more likely to drop out of post-secondary programs and what will

attract them to enroll and keep them in programs so that they are

successful. (para. 3)

Several articles have been written on the topic of students with disabilities and

their access to post-secondary learning, but the focus is on support programs or transition

concerns, not course design or instructional strategies (Lindsay, Harman, Fellin; 2016;

Poppen, Sinclair, Hirano, Lindstroom, & Unruh, 2016; Wilson, Getzel, & Brown, 2000).

One research study that focused on instructional strategies at the post-secondary level

(guided note taking) had very small sample sizes, Study 1, $n = 5$, Study 2, $n = 3$ (Lazarus,

1993), but all students had academic improvement on weekly quizzes. Gilbertson et al.

(2010) examined the impact of a self-monitoring checklist with performance feedback on

the generalization of study skills for college students ($n = 7$). Students used the checklist of

study skill strategies to increase the accuracy of their own notetaking and study guide

skills. Following one booster session, six students showed an increase in performance.

The qualitative study conducted by Hutcheon and Wolbring (2012) considered that

the higher education "disability" policy using an ableism lens contributes to the lack of

practical strategies for students with disabilities. Ableism is an "individual and group

perception of certain abilities as essential" (p. 2). Given this notion, universities will provide accommodations, because of legal obligations (Americans With Disabilities Act of 1990; Section 504 of the Rehabilitation Act of 1973); with the assumption, these prescriptive provisions are sufficient to level the playing field for students. Research has shown students with disabilities are still underperforming compared to their able-bodied peers, particularly online (Jaggars & Xu, 2011) and there is underrepresentation of disability topics in the top-tier research journals of higher education (Peña, 2014).

    Language. Students who are English learners also underperform compared to their English-speaking counterparts (Xu & Jaggars, 2013). Kanno and Cromley (2010) identified three types of English learners: mono-lingual-English-speakers, English-proficient linguistic minority speakers, and English language learners (ELL). The major distinction between the linguistic minority and ELL group is in language proficiency. Their study sought to find factors in the ELL population that contributed to their access to college and degree attainment in a longitudinal study ($N = 12,140$) that followed high school graduates. Using chi square tests, significantly different patterns were found among the three language groups for both college access and attainment. In the category of ELLs, 43.9% did not advance to post-secondary education with 18.9% attending four-year institutions compared to 24.3% of monolingual English speakers not attending post-secondary education and 43.2% moving to four-year institutions after high school.

    A study conducted in Taiwan investigated 99 freshmen students in an online English class (Chang, 2007) and identified as having a higher or lower English proficiency skills. In this 2 x 2 design, students received one of two conditions, self-monitoring prompts, or no prompts. The outcomes measured were academic performance and

motivational beliefs. The findings indicated a significant difference between those students who used the self-monitoring prompts, regardless of proficiency, performed better on both measures than those students who did not receive the prompts. Additionally, low-proficiency students who received the self-monitoring prompts performed statistically higher than low-proficiency students in the control group did. "This result suggests that the self-monitoring treatment compensated for a lack of use of metacognitive strategies among the lower-level English proficiency group" (p. 194). Participants who used the prompts were able to make up for some of the deficits in metacognitive strategies among the students with the lowest English proficiency. ELLs need support in college classrooms and the use of specific instructional design strategies such as self-monitoring prompts have shown to be effective for this population.

Self-Directed Learning

Self-directed learning (SDL) is rooted in the field of adult education (Knowles, 1973) with the adult learner being one who is intrinsically motivated, an independent learner, and can direct their own learning through prior experiences brought to the present context. Several models of self-directed learning have been explored throughout the years (Brockett & Hiemstra, 1991; Candy & Brookfield, 1991; Garrison, 1997; Guglielmino, 1977; Knowles, 1973; Merriam, 2001; Van Merriënboer & Sluijsmans, 2009) that have influenced adult education. Researchers at the K12 level tend to look for influences and strategies that support self-regulation, typically with low academic achievers or students with disabilities (Ganz, 2008; Horner & O'Connor, 2007; Kitsantas, Robert, & Doster, 2004; Mason, 2004; Zimmerman & Martinez-Pons, 1990). The self-regulation strategies build as an individual matures into an adult with self-directed learning skills.

A few researchers have begun to explore the implications of self-directed learning and self-regulated learning theories in the context of online learning environments (Lowes & Lin, 2015; Song & Hill, 2007). While different measures of self-directedness have been considered, two measures have gained prominence in the field. First, The Self-Directed Learning Readiness Scale (Guglielmino, 1977) looks at an individual's perception of his or her own skills and attitudes. Another survey of self-directed learning, the Personal Responsibility Orientation to Self-Direction in Learning survey (PRO-SDLS, Stockdale, 2003) is couched in Brockett and Hiemstra's (1991) Personal Responsibility Orientation model and operationalizes SDL as control, initiative, motivation, and self-efficacy. The work of Stockdale (2003) in validating the PRO-SDLS considers both the teaching-learning transaction and the learner characteristics, which are in line with the context of this research. The learner characteristics encompass initiative and self-efficacy of the learner while the teaching-learning transaction is comprised of control and motivation. Self-regulation is a learner characteristic that comes with the learner and the teaching-learning transaction embed personal progress-monitoring tools in the instruction. Hiemstra and Brockett (2012) presented an updated model that includes context as a critical element, equal to the person and process. Thus, contemporary self-directed learning theories (Hiemstra & Brockett, 2012; Song & Hill, 2007) suggest the learning environment has influence on the ability of an individual to acquire the skills to direct their own learning.

Several studies have used the PRO-SDLS as a research instrument. Fogerson (2005) investigated readiness factors for taking higher education courses online and found a significant correlation between the composite SDL score and age. Additionally, the

results of the reliability study confirmed the original findings of Stockdale (2003). Holt (2011) used the PRO-SDLS in a study looking at SDL in the workforce. Some factors of SDL were predictors of computer anxiety, attitudes towards technology, and computer self-efficacy. Hall (2011) investigated the efficacy of a summer bridge program with incoming college freshmen and found academic achievement had a statistically significant correlation with the PRO-SDLS.

Executive Functioning/Self-Regulation. Self-regulation is a conscious behavior controlled by executive functions and is a branch of study in psychology (Hamilton, Vohs, Sellier, & Meyvis, 2011). Education tends to view self-regulation as a pathway to a self-directed learner (Dynan, Cate, & Rhee, 2008; Grow, 1991).

The use of self-regulated behavior or self-directed learning skills develop through a maturation process (Zimmerman, 1990). In another study, Zimmerman and Martinez-Pons (1990) identified a sample of thirty 5th graders, thirty 8th graders, and thirty 11th graders who were gifted, and thirty students each for 5th, 8th, and 11th grade ($N = 180$) with equal numbers of boys and girls. Structured interviews identified how students compared on mathematical and verbal self-efficacy across gender, grade, and giftedness. Gifted students reported higher use of organization and transformative strategies than regular students did with 11th grade reporting higher use than 8th grade, which was higher than 5th grade. Students' records keeping and monitoring were found significant based on gender with girls using these self-directed learning skills more frequently than boys. This study also indicated gifted students employ more organizing behaviors at a younger age as well. There was also indication some executive functioning and self-directed learning skills develop with age and maturity.

Ley and Young (1998) hypothesized self-regulating behaviors "could predict…underprepared…status or regular admission status among postsecondary students" (p 42). The results of their study ($N = 59$) suggested some self-regulation behaviors may be a distinguishing characteristic.

Personal Progress-Monitoring. Academic success, whether online or face-to-face, requires a personal investment from the student demonstrated by self-directed learning behaviors. These behaviors include executive functioning skills such as persistence, organization, and time management (Finley, 2014; Roblyer & Marshall, 2002; Saw, 2011). Also important in an online learning environment is the "academic locus of control" which is to say, the ability for students to have and perceive control over their learning environment (Levy, 2007; Lowes & Lin, 2015, p. 19).

Schunk (1982) conducted an experiment to investigate the effects of progress self-monitoring had on achievement and self-efficacy on a subtraction skills test for 8 and 9 year olds. The participants ($N = 30$) were grouped in either the self-monitoring group ($n =10$), external monitoring group ($n =10$), or no monitoring group ($n =10$). Monitoring (self or external) had a significant impact on perception of efficacy for all three outcomes, self-efficacy, skill, and persistence, compared to no monitoring. There was no statistical difference between monitoring types. This indicated children felt more confident in themselves, improved their skills, and would persist in their task longer when they were monitored and received feedback on their progress regardless of who monitored the progress.

In education settings checklists or prompt cards often record the presence or absence of desired behaviors, with supporting research done primarily with students who

have disabilities (Ganz, 2008; Hughes et al, 2002). Ganz (2008) summarized several case studies which demonstrated the success of self-monitoring strategies across many age groups and types of disability. Hughes et al (2002) conducted a multiple-base-line-across-participants design and established the efficacy of self-monitoring in the form of checklists or prompt cards for students with intellectual disabilities in the general education classroom.

Cennamo and Ross (2000) analyzed several techniques aimed at supporting self-regulation and personal progress-monitoring in a blended Child Development course. The participant population was primarily university freshman. The course had an enrollment of $N = 250$. In the study design, participants were given an acronym of GAME Plan (Goal, Action, Monitor, and Evaluate) to help them remember a model for self-regulated learning. The online monitoring system included an online grading feature, goal checklist, and time-dependent goals that were automatically emailed to students. Students overall wanted an online system that could monitor grades, provide an online checklist, and provide timely feedback in testing situations. It is interesting to note in this study that the strategy of *keeping records and monitoring* only provided two web-based supports: cumulative grades posted online and printer-friendly page options to promote record keeping. The study occurred before Web 2.0 and the limitations of the technology are evident in the design. Ross suggested "an analysis of learning strategy use indicated that the four most commonly utilized learning strategies included keeping records, self-evaluation, setting goals, and pacing (as cited in Cennamo & Ross, 2000, p. 14).

In an examination of the relationship between self-regulating skills and web-intensive activities (Lawanto, Santoso, Lawanto, & Goodridge, 2014), the online activities

of low and high performing engineering students were tracked. The study was conducted in a web-intensive engineering course that required that students meet in a computer laboratory and receive lectures via web-conferencing software. A teaching assistant was present to facilitate participation during the lecture. Student participants ($N = 57$) were evalutated on four measures: the Online Self-regulated Learning Questionnaire (24 question), data logs from the LMS, self-ranking questions, and students' project performance. Student performance groups (low or high) were based on the final project. A review of the course data logs found higher performing students accessed all course materials - *assigned, optional,* and *informative* - through the class LMS significantly more frequently than their lower performing counterparts. Higher performing students also submitted assignments with more promptness. The statistical analysis from the questionaire revealed the higher-performing students outperformed the lower-performing students on three goal setting items: "I set standards for my assignments in online courses," "I set short-term (daily or weekly) goals as well as long-term goals (monthly or for the semester)," and "I keep a high standard for my learning in my online courses" (Lawanto et al., 2014, p. 15). Higher performing students identified more goal setting and task oriented strategies those who were lower performing. They also exhibited greater accessing of course content and higher prompt return of assignments compared to those who were lower performing (Lawanto et al., 2014). Based on this research, higher performing students behave significantly different than their lower performing peers in the web-intensive engineering course in regards to goal setting, executive functioning strategies, accessing materials, and submitting assignments on time.

Prompts. Self-directed learning requires that learners manage their time effectively and asks themselves questions to engage in their work. To this end, instructors may embed prompts into the instruction or independent study time of students to encourage reflection and critical thinking.

Kauffman et al. (2008) used automated instructional self-reflection prompts to aid problem-solving for students at a community college. Based on demographics of the school, 95% of the student population were below academic college performance in at least one basic skill. More than 75% of the students in the school were immigrants, and over 27% were single mothers. In this 2 x 2 design, undergraduate education majors (39 female, 15 male) were given two case studies regarding classroom management principles. Participants were between 18 and 21 years old. After reading the materials, participants were instructed to "send an e-mail to the teacher" identifying the classroom behavior problems and offering some solutions (p. 16). The two factors in the design were problem solving prompts (to focus their attention on the information provided in the case study) and reflection prompts (to rate their confidence). All case study materials and prompts were embedded in a web-based database. The outcome measures were to look at problem-solving skills (flexibility, limiting behavior, classroom climate) and writing quality (clarity, fluency, argument). The results indicated main effects for problem-solving prompts on case study one and case study two. Only students who received both problem-solving and reflection prompts had higher writing quality than those who received no prompts or only reflection prompts. Based on this research, problem-solving prompts may serve to clarify the process goal of the learning experience. The visual prompts seemed to have a significant influence on the behavior and achievement of students.

Kauffman et al. (2008) and Kauffman, Zhao, and Yang (2011) examined the effects of notetaking formats and self-monitoring prompts on learning from online text. This repeated measures ANOVA examined three types of notetaking strategies and the presence of self-monitoring prompts. Of the 119 participants, 74 were female and 45 were male. Participants were in their junior year of college, taking an educational psychology course, and averaged 21 years old. A web-based learning environment was created for the participants. A pretest regarding wild cats was administered to identify prior knowledge. Detailed informational text about wild cats was then presented. Participants were assigned one of three notetaking types (Conventional, Outline, or Matrix) and one of two self-monitoring prompt conditions (present/absent). Four days later, participants were instructed to come back and take the posttest to measure retention. The results indicated "the presence of self-monitoring prompts assisted the conventional note takers more than it did the matrix note takers" (p. 320). According to Kauffman et al. (2008), one reason for the difference was in the completeness of notes. Matrix note takers began the posttest with more complete notes than either the conventional- or outline-style note takers, thus required less prompting about the information presented. Additionally, "...the presence of self-monitoring prompts aided matrix note takers more than other note takers on the application test. There were no other significant main effects on the application test" (p. 321). Overall, this study supports the use of a matrix notetaking strategy accompanied by embedded self-monitoring prompts that alert the student to potentially important information that may have been overlooked. In light of this finding, prompts to encourage self-monitoring should benefit all students.

Taub et al. (2014) sought to investigate whether the level of prior knowledge a student brought to a hypermedia-learning environment predicted the use of cognitive and metacognitive self-regulation strategies. The 112 undergraduate students (65% female) were given a pretest and separated into high (score over 20) and low prior knowledge (score under 20) groups based on the median score of 20 out of 25. Log data from the online tutoring program identified self-regulated learning strategies the participants utilized during the one-hour study session. Expected cognitive strategies included notetaking, creating summaries, making inferences, and activating prior knowledge. Metacognitive strategies involved judgments of learning, feeling of learning, content evaluation, and monitoring progress towards goals. An onscreen clock counting down the time left in the learning session supported "monitoring progress toward goals" (Taub et al., 2014, p. 359). Results showed a significant difference in the use of metacognitive strategies for the high prior knowledge group compared to low prior knowledge group, but not in cognitive strategies (e.g. note taking). The sequence of strategy use was also different between the prior knowledge groups. This research supports the effectiveness of self-monitoring strategies in an online course environment.

Chang's (2007) study discussed earlier with Chinese-speakers studying English found on average students who used the self-monitoring prompts performed better than those students who did not receive the prompts. The effect of using the self-monitoring prompts was greater for students with lower English proficiency than those with a higher proficiency, thus serving to close the achievement gap between higher- and lower-proficiency levels. This shows English learners need a way to self-monitor in their

coursework because using self-monitoring prompts worked, especially for students with lower proficiency levels.

      In a digital environment, prompts often take the form of self-reflection questions as a characteristic of self-directedness and self-monitoring. The work of Taub et al. (2014) and Chang (2007) provide evidence that prior knowledge and language proficiency impact self-directed learning skills, specifically metacognition. Chang (2007) identifies the strengths of students with high proficiency in the target language compared to their lower performing peers. Prompts aid metacognition, the ability to think about how one learns, which in turn influences the expression of executive functioning. Monitoring one's own progress shows the ability to work towards a goal, typically a goal of high academic achievement. Yet education is not the only context in which self-directed learners monitor their progress.

      Insights from other fields. Self-monitoring, a piece of self-regulation and self-directedness, is a pivitol behavior, that applies to contexts in school and at home (Koegel, Koegel, & McNerney, 2001). The work force also uses personal progress monitoring strategies, such as checklists, mnemonics, templates, and reminder cards both to train new employees and to maintain a high level of performance behavior (Allan, 2015; Watkins & Leigh, 2009). Checklists are a visual cueing and process management tool that supports executive functioning. They have been used as a rehabilitation strategy for individuals regaining executive functioning skills after a traumatic brain injury (Catroppa & Anderson, 2006), and also in professions such as nursing and aviation to maintain fidelity of procedures and tasks (Clay-Williams & Colligan, 2015; Hales, Terblanche, Fowler, & Sibbald, 2008; World Health Organization, 2008).

Businesses use checklists for consumers as well. In an examination of the "endowed progress effect" (Nunes & Drèze, 2006, p. 3), participants were given a punch card for a free carwash. Either participants received a 10-space purchase reward card with two pre-filled spaces, or they received a reward card with eight spaces, none pre-filled. Those with a prefilled card were significantly more likely to finish the card and redeem it for the free product. This suggests that providing some marks toward a completed card encouraged completion of the card. This concept may transfer to the classroom and encourage students in a learning situation to persist as they see visible progress of work completed.

Self-Directed Learning theory suggests context, person, and process are important in the success of a learner. Checklists have application in many contexts to support executive functioning and self-directedness. The literature suggests personal progress monitoring and self-regulation strategies have a significant effect for English learners, students with disabilities, and even college freshmen. Previous research has considered personal progress monitoring checklist strategies at the K12 level and the work place. A gap exists in the use of checklists as a personal progress monitoring tool at the post-secondary level, a midpoint between K12 and the work force for many individuals.

Measures of Success

Success in higher education can be a nuanced concept, which includes themes such as degree attainment, academic achievement, rates of transfer from a 2-year to 4-year institution, personal satisfaction, or post college income (Kuh et al., 2006). However, for the purposes of this study, persistence and performance were two aspects of success that were explored due to the relationship they have with one another. Performance in a course

typically depends on the degree to which the student persists (e.g. attends class, submits assignments, and takes tests). For this reason, first persistence is discussed, then performance.

Persistence. The ability of a student to persevere to the end of a course or term – persistence - is influenced by four factors in online courses according to Hart (2012). First, the student's status within the college will encourage persistence, for instance, the student who is one-semester from graduation has an increased sense of drive to complete the online course. Second, persistence is facilitated by the ability of the student to think flexibly and manage time. A third factor is goal commitment and fourth is grade point average. Students with higher GPAs tend to persist compared to students with lower GPAs. Xu and Jaggers (2013) investigated students' adaptability to online learning, meaning the individual's ability to persist and perform in an online environment. Their findings across many student characteristics and subject areas at the community college level using a dataset of nearly 24,000 students across all 23 Virginia community colleges tracked from 2004-2008 support Hart's (2012) four factors of persistence. The persistence of students in an online course was 91.2% compared to a face-to-face course that had a 94.4% persistence rate ($N = 469,287$ for course completers). They also used multilevel modeling techniques for student characteristics. Online courses were significantly more popular among females, English-fluent students, those who applied and were eligible for financial aid, who never enrolled in remedial education, who were above 25 years old at college entry, who had earned credits in previous semesters, who had enrolled in computer literacy or development courses, and who had attempted online courses before.

In a 2009 study, Park and Choi examined factors influencing adult learners'
persistence in online learning. They considered individual characteristics (e.g., age and
gender), internal factors (e.g., relevance, a sub-dimension of motivation), and external
factors (e.g., family supports). Data collected on 147 students enrolled in an online course
indicated internal (satisfaction and relevance) and external (family and organizational
support) factors influenced the decision to persist, but individual characteristics did not.
They concluded that increasing the relevance of a course through instructional design
strategies would also increase persistence rates (Park & Choi, 2009).

Individual characteristics influence persistence, but online learners consistently
have lower persistence rates than their face-to-face counterparts. The studies summarized
here provide reasons students may persist, but did not directly seek to influence the actual
persistence of students.

Performance. Students who are more likely to be successful in online courses, as
indicated by passing grades, tend to be white and female (Figlio, Rush, & Yin, 2010;
Rovai, 2003; Xu & Jaggars, 2013). The less academically prepared the student, the greater
the negative impact online learning has on the academic success of the student as
indicated by passing the course with the grade of a C or better on the first try (Dille &
Mezack, 1991; Xu & Jaggars, 2013).

Xu and Jaggers (2013) used a complex formula for their individual fixed effects
model that allowed them to compare the students' online adaptability compared to face-to-
face courses taken by the same student over time. In the model, the adaptability coefficient
was isolated such that a negative relationship indicated an inability to adapt in online
courses regardless of all other individual characteristics. This model analyzed both

persistence and performance. For students who persisted to the end of the term ($N =$ 469,287), the average grade on a 4.0-point scale for online courses was 2.77 compared to 2.98 for face-to-face courses. The coefficients in the model were all significant and negative for both persistence and performance. Hence, most students had difficulty adapting to the online environment when controlling for their individual characteristics. Female students had higher course persistence and course grades when compared to males. When the study considered the effect of remediation on performance, the comparison between those who took no remedial courses and those who took any remedial courses was significant. Xu and Jaggers reported that those "who entered college with lower academic preparedness had more difficulty adapting to online courses" (2013, p. 18).

In an earlier study, Morris, Finnegan, and Wu (2005) looked at the asynchronous online participation of students. Student behavior was analyzed using a regression model that looked at online discussion forum activity and the time spent reading or responding to discussion forums. The finding was that time spent on task and a higher frequency of participation contributed to successful online learning. Additionally, the eight variables in the regression model (number of discussion posts viewed, number of content pages viewed, number of original posts, number of follow-up posts, seconds on viewing discussion pages, seconds on viewing content, seconds on creating original posts, and seconds on creating follow-up posts) were able to explain 31% of the variance in achievement. However, only three variables were significant as predictors of course grades. There were the number of discussion posts viewed, the number of content pages viewed, and the number of seconds viewing the discussions.

The research by Haak, HilleRisLambers, Pitre, and Freeman (2011) demonstrated that underprepared students could close the academic achievement gap in a face-to-face class with increased structure. To reduce the achievement gap, interventions must show a greater benefit for the EOP students than non-EOP students. A biology teacher for BIOL 180 *Introduction to Biology* found a significant gap in achievement for EOP (Educational Opportunity Program) students and non-EOP students. The EOP students were from educationally or economically disadvantaged backgrounds. The typical low-structure course format was primarily lecture-based with performance measured on a midterm and final exam. When the instructor created a high-structured environment with active learning activities (response clickers) and weekly assessments, all students made academic gains; however, the gains for the EOP students were disproportionate to the non-EOP students. The gap in grade points on a 4-point scale fell from a difference of 0.80 to 0.44 grade points.

Individual characteristics have a great influence on performance regardless of the online or face-to-face delivery method, yet specific interventions that facilitate a more structured learning environment with increased participation have also shown significant results. Course grades typically indicate the performance measure. Factors that contributed to higher course grades included individual characteristics of gender and race as well as behaviors such as time spent reviewing discussions and the number of views for discussions or content pages. Checking course content is a behavior trackable by data logs. Marking work as complete is also observable by logs that may impact course grades.

Summary

The literature indicates that while online instruction may be as effective as face-to-face instruction (Means et al., 2010), there is a certain population of students who struggle with both persistence and performance in online courses, namely, underprepared students (Dabbagh, 2007; Fishman, 2014; Hanover Research, 2013). Underprepared students include those who have required remedial work (Jaggars & Xu, 2011), have a disability (Hanover Research, 2013), or are English learners (Barbatis, 2010). Self-directed learning skills such as personal progress-monitoring are positively associated with persistence and performance (Hart, 2012; Morris et al., 2005; Lawanto et al., 2014). Evidence was presented where disproportionate gains were made between lower and higher performing groups (Chang, 2007; Haak et al., 2011) when provided increased structure and prompts to monitor one's own progress. Checklists are one type of instructional strategy, embedded in the design of the course, which provides a structure and visual evidence of progress. Gilbertson, Mecham, Mickelson, & Wilhelmsen (2010) found a checklist of study skills beneficial for students with disabilities in a college setting, but the sample was small. Cennamo and Ross (2000) used several techniques, including a paper-based checklist to promote record keeping, but it was not specifically analyzed for effectiveness. Underprepared students have benefited from strategies that promote self-directed learning through self-monitoring (e.g. checklists). Understanding course design plays a critical role in the perceptions of a successful (online) learning experience (Park & Choi, 2009; Song et al., 2004). This study will consider to what extent a personal progress-monitoring tool, *Completing Tracking*, embedded in the LMS, is related to students' performance and persistence in an undergraduate course with face-to-face and online sections.

CHAPTER III: Methodology

Methodology

This chapter reviews the research questions, the population, sampling procedures, and the instrumentation used in the study. A description of the research procedures, data collection, and analysis of the data follows.

Research Questions

This study answered the following questions.

1. Is there a significant relationship between the percentage of *Completion Tracking* usage and total percentage of points achieved by undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

2. Is there a significant relationship between the percentage of *Completion Tracking* usage and persistence in the course, measured by taking the scheduled final exam, or the date of last login, by undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

3. Is there an association between preparedness, as indicated by a self-report of remediation, and self-directedness, as measured by the PRO-SDLS?

Population and Sampling

The target population for this study is higher education undergraduate students. The accessible population of convenience was undergraduate students at a mid-size public university ($N = 14,489$/year) with a convenience sample ($N = 213$) who enrolled in ANTH

1100 *General Anthropology* in spring 2016. This course is required for Anthropology

majors and fulfills a general education requirement in "Behavioral and Social Science."

Not all students are obligated to take ANTH 1100 as there are 14 other classes that meet

the same general education requirement.

The institution provided historical data for both the university and ANTH 1100

course enrollment for the fall 2014, spring 2015, and fall 2015 semesters. The data

included gender, academic class, race/ethnicity, and remedial course enrollment. Table 1

shows ANTH 1100 in relation to the entire university relative to gender of students. While

just over half of the university population is female on average (53%), in the same time

span, 71% of the students in ANTH 1100 have been male.

Table 1
*Semester Average University and ANTH 1100 Enrollment for Three Terms, Fall 2014-Fall
2015, by Gender*

Gender	University Population		ANTH 1100 Population	
F	7161	53%	122	29%
M	6402	47%	301	71%
Grand Total	13418	100.00%	423	100.00%

Table 2 shows the average national and ethnic status of students for both the

university and ANTH 1100. The enrollment for Caucasians is 71% for the university, but

only 36% in ANTH 1100. The average international student enrollment in ANTH 1100

(52%) is nearly five times higher than the average international student enrollment for the

university as a whole. One of the potential impacts of international students, or any

student with limited English proficiencies, is their ability to access course materials to find

academic success (Martirosyan, Hwang & Wanjohi, 2015). The university standard for

international student's admittance to the university is to pass an English proficiency exam.

Several testing options are available, but the TOEFL (http://www.ets.org/toefl/) is used here for illustrative purposes. The test has four subsections - reading, listening, speaking, and writing, which are equally weighted for a total score range of 0 – 120 points. The cut score for acceptance at the institution is 61 points, or 51% of the total points possible.

Table 2

Semester Average University and ANTH 1100 Populations Reporting National Status, Disaggregated by Race/Ethnicity for Three Terms, Fall 2014-Fall 2015.

Ethnicity by National Status	University Average		ANTH 100 Average	
Domestic	*12116*	*89%*	*202*	*48%*
African American	154	1%	3	1%
Alaska Native	4	0%	0	0%
American Indian	128	1%	3	1%
Asian	187	1%	3	1%
Caucasian	9583	71%	152	36%
Hispanic	1117	8%	30	7%
Hispanic of Any Race	2	0%	0	0%
Multiple Reported	314	2%	6	1%
Native Hawaiian	3	0%	0	0%
Pacific Islander	22	0%	1	0%
Race and Ethnicity Unknown	602	4%	4	1%
International	*1447*	*11%*	*221*	*52%*
Grand Total	13563	100%	423	100%

Table 3 illustrates the university and ANTH 1100 enrollment averages based on academic class. Freshmen were more likely to be represented in ANTH 1100 than the university enrollment (60% v 27%). This difference is anticipated since ANTH 1100 is a freshmen level, general education course. The "other" category includes post-baccalaureate students, perpetual students, graduate students, and unknown academic class, a category not usually represented in ANTH 1100 enrollment.

Table 3

Semester Average University and ANTH 1100 Populations by Academic Class, Fall 2014-Fall 2015.

Academic Class	University Average		ANTH 1100 Average	
Freshman	3634	27%	254	60%
Sophomore	2184	16%	100	24%
Junior	1731	13%	34	8%
Senior	3076	23%	33	8%
Other	2939	22%	0	0%
Grand Total	13563	100%	423	100%

Table 4 indicates that on average, 27% of previous ANTH 1100 students had taken remedial work (enrolled in remedial math or remedial English) over the past three semesters while only 2% of the university population took remedial coursework in the same semesters. Recall that 22% of the university population is comprised of "Other" students (an average of 2,939 per semester), of whom less than 0.1% enrolled in remedial courses between Fall 2014 and Fall 2015.

Table 4
Semester Average University and ANTH 1100 Populations Disaggregated by Remediation, Fall 2014-Fall 2015

Remediated	University Average		ANTH 1100 Average	
No	13248	98%	309	73%
Yes	315	2%	114	27%
Grand Total	13563	100%	423	100%

Freshmen and sophomores comprise 84% of ANTH 1100. Table 5 shows that on average, 7% of the domestic underclassmen enrolled in the university were academically underprepared, as evidenced by their remediation requirements, while just 5% of

international students were underprepared, for a total of 12% of the university freshmen and sophomores remediating in the sample set.

Table 5

Semester Average of University Freshmen and Sophomores, Fall 2014-Fall 2015, Who Remediate, by National Status

University Freshmen and Sophomores				
	Remediated			
National Status	**No**	**Yes**	**Total**	**% Remediated/Total**
Domestic	4535	417		7%
International	560	305		5%
Total	5095	723	5818	12%

Table 6 shows the semester average of ANTH 1100 freshmen and sophomore students who took remedial courses during the three sample semesters compared to the average total freshmen and sophomore enrollment which placed them in the category of underprepared. While the university, over three semesters, averaged 12% of freshmen and sophomore students requiring remediation, an average of 44% of freshmen and sophomore students enrolled in ANTH 1100 remediated. Upon closer examination, the relationship between ANTH 1100 and the university for domestic freshmen and sophomore remediation is similar, an average of 7%. International freshmen and sophomores, conversely, have a sizeable difference in remediation when comparing the university (5%) to ANTH 1100 (37%).

Table 6

Semester Average of ANTH 1100 Freshmen and Sophomores (Fall 2014-Fall 2015) Who Remediate Based on National Status

Freshmen and Sophomores in ANTH 1100				
	Remediated			
National Status	**No**	**Yes**	**Total**	**% Remediated/Total**
Domestic	124	24		7%
International	75	131		37%
Total	199	155	354	44%

Table 7 displays the university freshmen and sophomore classes disaggregated by national status and gender, and crossed with their remediation status. The data indicate international freshmen and sophomores (Male, 36%; Female, 27.5%) remediated at much higher rates than domestic freshmen and sophomores (Male, 7.5%; Female, 9.1%), regardless of gender. Male international freshmen and sophomores were the most likely to require remediation (36.0%). The data also shows the ratio of average male: female domestic freshmen and sophomore enrollment (2825:2127) is in sharp contrast to international freshmen and sophomores (69:797) for the university.

Table 7

Semester Average University Freshmen and Sophomores Who Remediate by National Status and Gender, Fall 2014-Fall 2015

University			
	Remediated		
National Status by Gender	**No (%)**	**Yes (%)**	**Total (%)**
Domestic			
F	2568 (90.9)	257 (9.1)	2825 (100)
M	1967 (92.5)	160 (7.5)	2127 (100)
International			
F	50 (72.5)	19 (27.5)	69 (100)
M	510 (64.0)	287 (36.0)	797 (100)

Table 8 reports ANTH 1100 freshmen and sophomores who remediated,

disaggregated by national status and gender. International students were still more likely

to remediate than domestic students (average of 130 per semester compared to 24 per

semester), with male international students more than twice as likely (65%) to require

remediation than female international students (25%).

Table 8
*Average Number of ANTH1100 Freshman and Sophomores Who Remediate, by National
Status and Gender, Fall 2014-Fall 2015*

ANTH 1100			
	Remediated		
National Status by Gender	No (%)	Yes (%)	Total (%)
Domestic			
F	67 (82.7)	14 (17.3)	81 (100)
M	57 (85.1)	10 (14.9)	67 (100)
Total	124 (83.8)	24 (16.2)	148 (100)
International			
F	8.3 (72.3)	3.3 (27.3)	12 (100)
M	67 (34.5)	127 (65.5)	194 (100)
Total	75 (36.4)	131 (63.6)	206 (100)
Grand Total	**199 (56.2)**	**155 (43.7)**	**354 (100)**

One conclusion the data supports is that students who enrolled in ANTH 1100

from the fall 2014 semester through the fall 2015 semester were less prepared than the

university student body as a whole. This indicates many students who take ANTH 1100

may be under the umbrella of underprepared because of remediation. Female international

students who were freshmen or sophomores required remediation at about the same rate

(27.3%) as female domestic students (17.3%). Male international students required

remediation at a much higher rate (65.5%) when compared to male domestic students

(14.9%). This information suggests significant differences between the university

population and the ANTH 1100 sample on the characteristics of preparedness. This difference suggests that ANTH 1100 is an appropriate context for examining the relationship between preparedness, persistence, achievement, and SDL levels. Yet, the findings have bias and should be generalized only to undergraduate students of this university.

Instrumentation

For this study, the dependent variables were final course point total and persistence rate. SDL levels and participant demographics were identified through the use of two instruments, the Personal Responsibility Orientation to Self-Directed Learning Survey (PRO-SDLS; Stockdale, 2003) and a three-factor questionnaire.

PRO-SDLS. Stockdale (2003) developed the PRO-SDLS to be a measure of the construct of self-directed learning. The instrument consists of a 25-item self-assessment survey that requires the participants to rate themselves on a 5-point scale from Strongly Disagree to Strongly Agree (Stockdale & Brockett, 2011).

Previous researchers have used the scale as a measure of self-directedness in learners (Conner, 2012; Fogerson, 2005; Hall, 2011). The validity and reliability of the instrument were determined through a factor analysis after using the Delphi strategy to reach consensus on the survey items (Stockdale, 2003, p.170-174). Overall, the calculated reliability coefficient (alpha) was .91. Four constructs were measured related to self-direction and were reported here with the reliability coefficients in parentheses (Cronbach's alpha): Control (.78), Initiative (.81), Motivation (.82), and Self-efficacy (.78). With all coefficients greater than .70, this survey has been considered acceptable for reliability (Worthen, Borg, & White, 1993). There is a correlational relationship note: "An

increase in a student's PRO-SDLS score is generally linked to an increase in his or her academic performance" (Stockdale, 2011, p. 174). The PRO-SDLS has a minimum score of 25.0 and maximum score of 125, however, due to a coding error in this research project, one question was removed which adjusted the scale, 24-120. When given to the participants in this study, the survey had the title *A Learning Experience Scale*. See Appendices B and C for permission and the survey instrument.

Three-Factor Questionnaire. The researcher-created a three-factor questionnaire to supplement the PRO-SDLS. The three factors were self-report items unavailable through Institutional Research that have been identified in the literature as characteristics of underprepared students. They are remediation (Jaggars & Xu, 2010), English as another language (Jaggars & Xu, 2010), and disability (Hanover Research, 2013). Institutional Research can only provide historical remediation data while the Remediation Item on the questionnaire asks for past, present, and future need for remediation. The questions on remediation and English as a second language are "yes/no" while the question on disability is a categorical question with six options. Participants could choose more than one category of disability.

Procedures

Two asynchronous online sections of ANTH 1100 and one face-to-face section were recruited to participate in this study. The sections used identical instructional materials although the online section had minimal instructor involvement. The face-to-face course received live lectures, but all course materials were available in the same structure as the online courses through Moodle.

The ANTH 1100 course for this study was delivered over a 16-week semester. Weekly lectures (narrated PowerPoint slideshow), organized by topic, were posted which students downloaded and viewed. Other course activities include weekly chapter quizzes, midterm, final exam, and supplementary web-based resources. The screenshot in Figure 6 exemplifies what students saw every week.

Topics: Language and Communication
Readings: Chapters Nine
Notice: The second assignment is due at the end of the week!
Lecture Related Materials:

The lecture for chapter nine will be delivered from lecture notes. No PPT is available.

Chapter Nine Outline
American Tongues
Language (PC)
Language (Mac)
Quizzes:

Chapter 9 Language and Communication- Quiz #1
Chapter 9 Language and Communication- Quiz #2

Figure 6. Example of ANTH 1100 course structure with *Completion Tracking*.

Each activity element of the course (e.g. assignment, downloaded reading, quiz) had a corresponding checkbox. The face-to-face and online sections presented the same material and structure within their respective Moodle pages; the only difference was the online-only sections had access to recordings of lectures in both PC and Mac formats (as indicated in Figure 6). The face-to-face sections did not include the recorded lectures on its Moodle page.

In the third week of the term, the study began by opening the informed consent, PRO-SDLS, and three-factor questionnaire to students. The start date was after the

add/drop deadline to ensure that the enrollment was stable. Figure 7 shows the visual

layout of the screen with the survey entitled "A Learning Experience Scale". The three-

factor questionnaire was added to the Learning Experience Scale (PRO-SDL), so

participants completed only one survey activity

Figure 7. Screenshot of link to the survey

Completion of the survey indicated informed consent by the student to become

participants in the study; no additional activities or assignments were required. After an

initial statement in the course Moodle page, the instructor did not reference the tool or

remind students about the check boxes. Use of *Completion Tracking* was voluntary and

dependent upon student initiative.

Data Collection

Survey data, the gradebook, and *Completion Tracking* logs were exported from

Moodle into Excel at the end of the term. Institutional Research returned the demographic

information to the researcher based on the list of participants. Student usernames were used to compile and aggregate the data set. As three data sources were being merged into one data set, several Excel features were used to clean the data (see Figure 8)
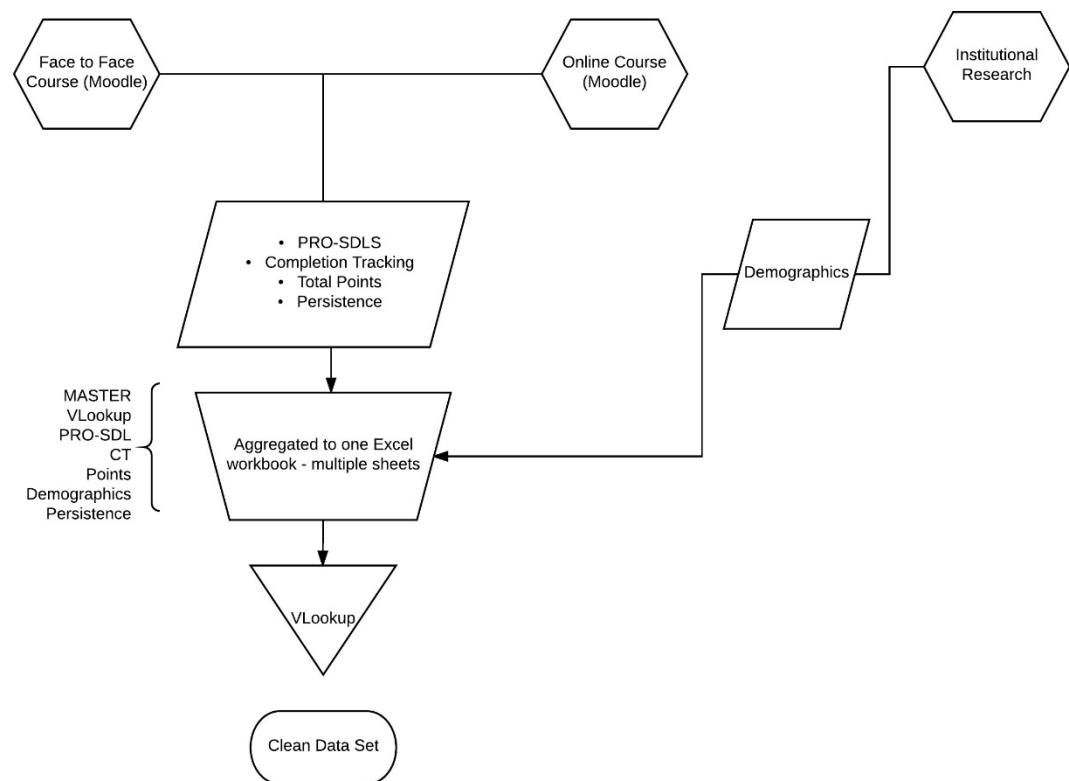
Figure 8**.** Data collection flowchart

First, all usernames from the survey respondents received an ID code on the "MASTER CODE" sheet. Within a single Excel file ("workbook"), a separate worksheet was created for each data type and all imported text data were changed to numerical outputs (Strongly Agree = 5, Agree = 4, Sometimes = 3, Disagree = 2, Strongly Disagree = 1, Yes = 1, No = 0). A new column, labeled "ID" was added next to the username of each sheet. The "=VLOOKUP" command was used to match the username and ID code

for each worksheet. The final worksheet created was the sheet that combined cleaned data from all others. In the final worksheet, all personally identifiable information was expunged; only the study ID number was maintained.

See Figure 9 for a summary of the final variables used for the regression modeling and analysis.

Factor	Description	Indicators	Measures
CT%	Percentage of checkboxes marked	Percentage	0-100
CT Usage	Categories based on percentage ranges	L, M, H	0, 1, 2
SDL Total	Total score on PRO_SDL survey	Score	24-120
SDL Category	Category based on SDL score ranges	L, M, H	0, 1, 2
Eng L1	English is student's first language	Yes, No	0,1
Remedial	Student required to enroll in remedial courses	No, Yes	0,1
Disability	Student self-identified as having a disability	No, Yes	0,1
% of Total Points	Total points possible after removing extra credit	Percentage	0-100
% of Persistence	Taking the final exam or date of last login	Percentage	0-100
Course	Delivery of instruction, online or face-to-face	OL, F2F	0,1

Figure 9. Variables and descriptions used for data analysis.

Data Analysis

All descriptive statistics including frequency, mean, and standard deviations were calculated prior to running a regression analysis followed by hierarchical multiple regression to answer the three research questions of this correlational design ($\alpha = .05$).

The analysis of the variables in this study were as follows:

1. Is there a significant relationship between the amount of *Completion Tracking* usage and total percentage of points among undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, and self-directed learning level as measured by the PRO-SDLS?

This question is tiered so the individual factors (language, remediation, disability, SDL level) were entered in block 1 of the linear hierarchical multiple regression approach. *Completion Tracking* was then entered in block 2 to examine the effect of *Completion Tracking* after controlling for the effect of the other factors on the percentage of total points achieved among undergraduate students in a freshman anthropology course.

2. Is there a significant relationship between the percentage of *Completion Tracking* usage and persistence in the course, measured by taking the scheduled final exam, or the date of last login, by undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

This question was analyzed following the same method as the first, but looking for a relationship between *Completion Tracking* and persistence with a linear hierarchical multiple regression approach. Persistence was measured by completing the final exam (100%) or the date of last login. If the final exam was not taken, then a count of the number of days a student participated, ending at the date of last login, was used to calculate a percentage of the class completed.

3. Is there an association between level of preparedness, as indicated by a self-report

    of remediation, and SDL level, as measured by the PRO-SDLS?

    A chi-square test for independence ($\alpha= .05$) was used to examine the relationship

between preparedness (remediation, no remediation) and SDL level (High 76-115,

Medium 51-74, Low 25-50). This was done to see if the sample data fit the hypothesized

distribution of participants in each category.

Summary of Methodology

    This correlational study sought to examine the effect of *Completion Tracking* on

the identified criterion measures when controlling for specific learner characteristics

(language, remediation, disability, and SDL level) and course delivery. All participants

had access to utilize the tool, if they chose to do so.

CHAPTER IV

Results

The purpose of this study was to examine the impact of a personal progress-monitoring tool known as *Completion Tracking* on the academic success of students as indicated by total points and persistence rates. The performance aid, *Completion Tracking,* was a check-box feature in the Moodle LMS through which students voluntarily tracked their progress completing assignments and activities in a freshman-level Anthropology class. In addition, this study investigated the relationship between preparedness and self-directedness. Based on previous research, it was hypothesized that use of the *Completion Tracking* would be positively correlated with student achievement and persistence, and the three demographic factors reported in the literature, remediation, disability, and language, would be correlated with low SDL scores (Hanover Research, 2013; Jaggars & Xu, 2011).

As discussed in Chapter III, the identification of SDL levels and participant demographics occurred with two instruments, the Personal Responsibility Orientation to Self-Directed Learning Survey (PRO-SDLS; Stockdale, 2003) and a three-factor questionnaire. Total percentage of points achieved measured student achievement, and completing the scheduled final exam (or date of last login) measured persistence. The statistical analysis of the three research questions used these data. The specific questions addressed by this study are as follows:

1. Is there a significant relationship between the percentage of *Completion Tracking* usage and total percentage of points achieved by undergraduate students in a freshman anthropology course after controlling for the following

factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

2. Is there a significant relationship between the percentage of *Completion Tracking* usage and persistence in the course, measured by taking the scheduled final exam, or the date of last login, by undergraduate students in a freshman anthropology course after controlling for the following factors: remediation self-report, English as a primary language self-report, disability self-report, self-directedness, and course delivery?

3. Is there an association between preparedness, indicated by a self-report of remediation, and self-directedness, measured by the PRO-SDLS?

This chapter will first present a description of the sample used in this study followed by the results of the data analyses. A summary of the research results will conclude the chapter.

Description of the Sample

A total of 197 students enrolled in the targeted course sections for this study; of that number, 157 consented to the study by completing the SDL survey and three-factor questionnaire. Two students were removed from the study because they were identified as post baccalaureate students since this study was focused on undergraduates. Three other students were removed because they dropped the course or stopped attending after completing the SDL survey and three-factor questionnaire. Unfortunately, their persistence data was expunged from Moodle. The resulting total sample was $N = 152$ students. The demographic characteristics of the sample (gender, residency, and

remediation) were consistent with student characteristics from previous semesters, as presented in Chapter III.

The categorical breakdown for the sample ($N = 152$) is shown in Table 9. The data for the first four categories came from the university's database. The last three came from the Three-Factor Questionnaire. As anticipated when examining the data relationships for the sample by category, the data for class were skewed towards underclassmen (freshman and sophomores). There were twice as many face-to-face participants as online, and the international student population to domestic students is a two-to-one ratio. When considering the distribution of language, many international students come from countries where English is the language of academics. The need for remediation was over twice that expected from the previous ANTH 1100 averages presented in Table 4 of Chapter 3.

Table 9

Categorical Information for the Sample of (N = 152) Students Included in the Data Analysis

Category	Frequency Count	Percentage (%)
Online	48	32
Face-to-Face	104	68
Male	77	50
Female	75	50
Freshman	83	55
Sophomore	44	29
Junior	14	9
Senior	11	7
International	100	66
Domestic	52	34
English is Not First Language	18	12
English is First Language	134	88
Required Remediation	120	79
Required No Remediation	32	21
Disability Present	31	20
Disability Not Present	121	80

The means and standard deviations for the assessment results are presented in Table 10. A graphical inspection of the data determined the percentage of *Completion Tracking* (CT) usage (high, medium, low) was normally distributed with skewness of 0.55 ($SE = 0.20$) of the boxes marked complete. The Self-Directed Learning (SDL) total had a skew of -0.22 ($SE = 0.20$) and kurtosis of 0.60 ($SE = 0.39$) which was in the acceptable range for normal data. The percentage of total points is negatively skewed at -1.20 ($SE = 0.20$) and kurtosis of 1.90 ($SE = 0.39$). This was an anticipated phenomenon as instructors tend to create a learning environment where the majority of students are expected to be academically successful. Persistence was not normally distributed. As previously discussed, three participants dropped the course. Two additional participants did not take the final. All other participants completed 100% of the course. Thus, preliminary review of assumptions for regular analysis indicated some variables had extreme skewness while other variables had limited variance.

Table 10
Means and Standard Deviations for Predictor Variables and Dependent Criterion

Factor	*M* (*SD*)
Predictor Variable	
% of CT	34.20 (2.83)
SDL Total	82.10 (11.28)
% of Total Points	87.80 (0.01)
Dependent Criterion	
% of Persistence	99.93 (0.58)
Age	21.97 (0.47)

Research Question One

A two-stage hierarchical regression analysis was used to predict the effect of *Completion Tracking* on total points after controlling for specific learner characteristics. In the first block, remediation, disability, language, and course delivery were entered as covariates; in the second block, percentage of *Completion Tracking* was entered.

Correlations between the factors and total points are presented in Table 11. Remediation, course delivery, and percentage of *Completion Tracking* did not have a statistically significant correlation with points.

Table 11
Summary of Correlations, Means, and Standard Deviations between Factors and Total Points

Factor	*r*	*p*	*M*	*SD*
Points	1.00	-	81.42	11.36
Remedial	-.11	.09	.79	.41
Disability	-.25	**.001**	.20	.40
English not L1	.15	**.04**	.12	.32
Course Delivery	.06	.22	.32	.47
Percentage of CT	.12	.06	34.20	34.87

Note. Points = total points available in the course; Remedial = yes coded as 1, and no coded as 0; Disability = yes coded as 1, and no coded as 0; English not L1 = English is not the primary language, yes coded as 1, and no coded as 0; Course Delivery = online coded as 1, and face-to-face coded as 0; and Percentage of CT = continuous data of the percentage of boxes checked.

Table 12 summarizes the results of the hierarchical regression test. Block one was statistically significant, $F(4, 147) = 3.52$, $p = .01$, $R^2 = .09$, Adjusted $R^2 = .06$. The four factors included in block one accounted for 8.7% of the variance in total points for ANTH 1100.

When percentage of *Completion Tracking* (CT) was added in block two the model remained statistically significant, $F(4, 147) = 3.21$, $p = .01$, $R^2 = .10$, Adjusted $R^2 = .07$.

Completion Tracking did not predict total points significantly over and above the variables found in block one, R^2 change $= .01$, $F(1, 146) = 1.89$, $p = .17$. Based on these results, *Completion Tracking* offered little additional predictive power beyond what was contributed by disability and language.

Table 12
Summary of Hierarchical Regression Results (N = 152)

Block	R^2	Factor	t	p
1	.087	Remedial	-0.898	.296
		Disability	**-2.954**	**.004**
		English not L1	1.680	.094
		Course Delivery	0.176	.712
2	.099	Remedial	-1.048	.296
		Disability	**-2.892**	**.004**
		English not L1	1.685	.094
		Course Delivery	-0.370	.712
		CT Percentage	1.374	.171

Note. Points = total points available in the course; Remedial = yes coded as 1, and no coded as 0; Disability = yes coded as 1, and no coded as 0; English not L1 = English is not the primary language, yes coded as 1, and no coded as 0; Course Delivery = online coded as 1, and face-to-face coded as 0; and Percentage of CT = continuous data of the percentage of boxes checked.

Because the assumption of normality was not met for the percentage of *Completion Tracking*, the percentages were converted to categorical levels of use as shown in Table 13. This yielded the three categories of low, medium, and high use. A non-parametric Kruskal-Wallis test was used to determine if the mean rank of the total points of the students differed by *Completion Tracking* use category. Results indicated low *Completion Tracking* usage earned fewer points compared to those with high *Completion Tracking* usage, however the difference shown in Table 13 was not statistically significant, $\chi^2(2) = 4.19$, $p = .12$.

Table 13

Summary of Kruskal-Wallis Test of Completion Tracking Usage in Rank Order by Point Total

CT Usage	N	Mean Rank
Low (0%)	46	65.98
Medium (1-49%)	58	78.56
High (50%<)	48	84.09
Total	152	

In summary, after exploring the ability of *Completion Tracking* to predict total points and controlling for specific learner characteristics, there was no statistical significance. However, the presence of a disability does predict total points based on the hierarchical regression modeling used. The negative correlation between disability and total points was statistically significant. This correlation indicates those with a disability achieve fewer points than those without a disability in this course.

Research Question Two

Of the *N* = 152 participants who began the study, five students did not have 100% persistence in the course (3 dropped the course, 2 did not take the final). The overall completion rate was 96%. There was no statistically significant relationship between *Completion Tracking* and persistence because there was so little variance in the persistence scores. Table 14 shows the descriptive characteristics of the non-persisting students by type of course delivery. Of the five students who did not persist, two students completed 94% and 96% of the course respectively (determined by the last day they logged into the course). A third student completed 58% of the course and did not log in after midterms. The final two students dropped the course after taking the survey, however, after their withdrawing, all course-related data was expunged from Moodle.

Table 14

Descriptive Learner Characteristics for the Non-Persisting Students

Course Delivery	*n*	English not L1	Remedial	Disability
Online	4	4	2	2
Face-to-Face	1	0	1	0

To summarize, Question Two found little variance in persistence for those enrolled in the course. While no statistical analyses could be conducted in this study, the persistence rates of the online course (90%) and the face-to-face course (99%) support the findings of Jaggars and Xu (2011) with respect to persistence in online versus face-to-face courses.

Research Question Three

Students who indicated remediation were distributed across the three SDL categories, as shown in Table 15. The chi-square test was not statistically significant, $\chi^2(2, N = 152) = 4.64$, $p = .083$. Cramer's $\phi = .18$ indicates a small relationship.

Table 15

SDL Category by Remediation

SDL Category	Remediation		
	No	**Yes**	*Total*
Low	5	41	46
Medium	13	44	57
High	14	35	49
Total	32	120	152

Figure 10 visually illustrates the associations indicated by the SDL category (low, medium, high) and a student's need to remediate. The proportion of students who did not

require remediation and are in the low SDL category is 15.6%) of all non-remediated

students (n = 32, while students who required remediation and scored in the low SDL

category were 34.2% of all students required remediation (n = 120). Nevertheless, the

differences in these proportions was not found to be statistically significant in this study.
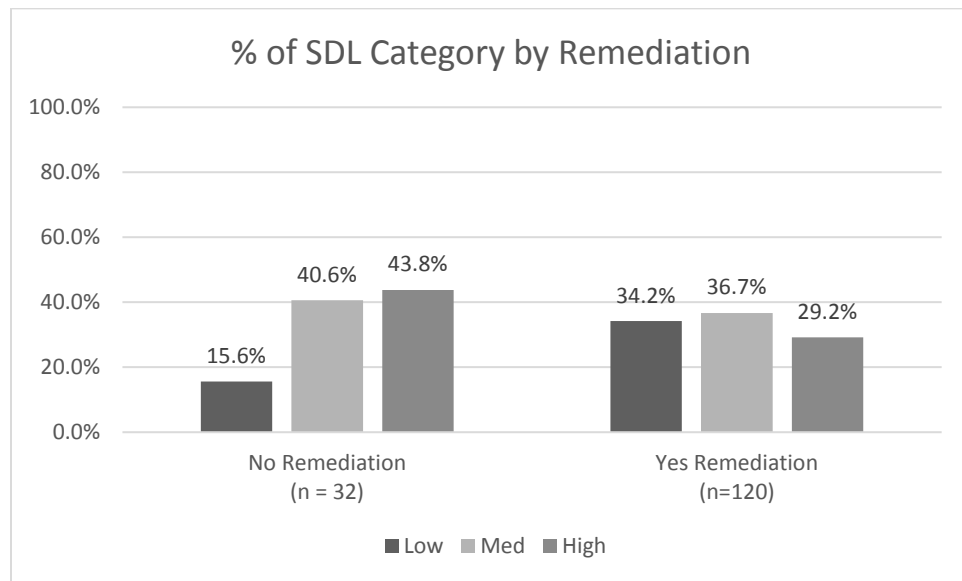

Figure 10. Graph of SDL category in relationship to student remediation based on

percentages

Post hoc Analyses

A chi-square test was conducted to determine whether there was an association

between the SDL category of students (high, medium, low) and the self-identification of a

disability. The chi-square test was statistically significant, $\chi^2(2, N = 152) = 8.76, p = .013$.

Cramer's $\phi = .24$ indicates a small relationship. This means those with high SDL level

were less likely to report a disability, and those with low SDL levels were more likely to

report a disability.

Similarly, a chi-square test found the relationship between SDL category and the

course delivery format (online or face-to-face) statistically significant, $\chi^2 (2, N = 152) =$

10.23, p = .006. The magnitude of the association was a small effect (ϕ = .26). The face-to-face course had a high percentage of students enrolled with low (78.3%) and medium (75.4%) SDL scores. Students with high SDL levels were equally likely to register for either course, face-to-face (51.0%) or online (49.0%).

As an additional analysis, *Completion Tracking* usage was split into three categories: those who never used the tool, those who used *Completion Tracking* 1-49% of the time, and those who used *Completion Tracking* over 50% of the time. The sample population was comprised of domestic (n = 100) and international (n = 52) students. A chi-square test indicated a statistically significant relationship between national status and *Completion Tracking* usage, $\chi^2(2, N = 152) = 37.35, p < .001$. Cramer's ϕ = .50 indicated a high relationship. Of those who never used *Completion Tracking*, 61.5% were international students compared to 14% of domestic students who never used the tool.

When the same *Completion Tracking* usage categories were associated with the course delivery format, the chi-square test indicated a statistically significant result, $\chi^2(2, N = 152) = 20.53, p < .001)$. Cramer's ϕ = .37 showed the association was of a medium size. It was found that 60% of those in the face-to-face course compared to 92% of those in the online course used *Completion Tracking*.

The same *Completion Tracking* usage categories were examined for their association with gender. The chi-square test of association was statistically significant, $\chi^2(1, N = 152) = 17.69, p < .001$. Cramer's ϕ = .34 indicated a medium-sized relationship. Of the sample population, 54.6% of males (n = 77) used *Completion Tracking* to some degree compared to 84.3% of females (n = 75) who used the tool to some degree.

Summary of Results

This study analyzed the usage of a personal progress-monitoring tool - *Completion Tracking* (CT) - as a predictor of total course points and persistence. Additionally, the study sought to show an association between self-directedness and college preparedness. Multiple demographic variables were considered as the literature suggested specific factors may be associated with self-directedness or preparedness. Three research questions were addressed. Question One dealt with the relationship between *Completion Tracking* usage and total points given various factors. An initial correlation analysis indicated language and disability predicted course outcomes rather than *Completion Tracking* usage. A hierarchical linear regression analysis indicated disability was the only significant predictor of total points while course delivery, language, remediation, and *Completion Tracking* percentage were not significant. The Kruskal-Wallis test suggested a positive relationship between total points and the degree to which *Completion Tracking* was used; however, the results were not significant.

Research Question Two focused on *Completion Tracking* and persistence in the course. With an overall persistence rate of 96% and the definition of persistence being those who took the final exam, no statistical analysis could be applied.

Research Question Three focused on the association between preparedness and self-directedness. Preparedness was reported on the Three Factor Questionnaire as requiring remediation and the PRO-SDLS provided the SDL scores. This finding from the Chi-square test was not significant and evidence from this research project is insufficient to support a claim of association between remediation and SDL.

The post hoc analysis did indicate disability and course delivery both had a significant interaction with SDL. Those with higher SDL were less likely to report a disability. Similarly, those with high SDL were equally as likely to enroll in the face-to-face or online course, but those with medium to low SDL were much more likely to enroll in the face-to-face course.

Nationality, gender, and course delivery each had a significant relationship with *Completion Tracking* usage. Domestic students were much more likely to use the *Completion Tracking* tool as were females and students enrolled in the online course.

In summary, the presence of a disability was the only predictor of academic performance. *Completion Tracking* had no statistically significant relationship with performance or persistence. Preparedness, as indicated by reported remediation, and SDL level were not significantly correlated. Domestic students, online students, and female students used *Completion Tracking*. SDL levels were correlated with disability and student selection of online or face-to-face course sections. This study showed only certain student demographics chose to use *Completion Tracking* and was not detrimental to those who chose to use the personal progress-monitoring tool.

CHAPTER V: Discussion

Discussion

This study examined the use of a Personal Progress Monitor (PPM) in undergraduate coursework, primarily through the lens of Universal Design for Learning (UDL). A review of the literature identified characteristics that impact academic achievement and persistence in online courses, including gender, language, remediation, disability, and age (Barbatis, 2010; Hanover Research, 2013; Jaggars & Xu, 2011). Also reviewed in the literature were studies that explored self-directed learning and PPM as performance aids; these studies suggested increased classroom structure, more frequent knowledge checks, and progress monitoring would affect academic success and persistence (Hart, 2012; Morris et al., 2005; Lawanto et al., 2014). In contrast to this previous research, the results of this study found no significant relationship between Completion Tracking and student performance or persistence. Instead, the factor that most impacted student performance was self-reported disability. In addition, the study found no relationship between preparedness, as indicated by self-reported need for remediation, and self-directed learning levels. The discussion that follows will consider the context of the study, propose an interpretation of the results, suggest implications for practitioners, and advocate for further research in both higher education and K12.

Background Context

The participants in this study were a unique subsection of the university population. As shown in both Chapters III and IV, the international student population and students requiring remediation who take ANTH 1100 are significantly higher than the distribution in the university at large. This provided both a challenge and distinctive

opportunity in this study. The challenge is in the transferability of the study to other undergraduate courses. Yet the opportunity is a study with a high number of underprepared participants who stand to gain the most from the results.

The literature suggests online courses are more challenging for underprepared students than their prepared counterparts, evidenced by academic achievement and online course persistence (Hanover Research, 2013; Jaggars & Xu, 2010; Jaggars, 2011; Xu & Jaggars, 2013). For students who completed the survey, the persistence rate was 96%, with 79% of the participants meeting the definition of underprepared. The literature does not highlight the characteristics that comprise underpreparedness. This study defines underpreparedness as needing remediation, having a disability, or having English as a second language. The results of the study found the individual characteristics of underpreparedness to be significant in different ways.

Interpretation of Results

The results of the three research questions are interpreted in this section. Question One asked about the effect of *Completion Tracking* on academic achievement; Question Two considered *Completion Tracking* and persistence. The final question looked at the relationship between preparedness and self-directed learning scores.

Completion Tracking did not affect academic success, nor did the need for remediation alone. The results from this study demonstrate that the presence of a disability may influence academic success in a general education course as taught online and face-to-face. This suggests that remediation and primary language do not affect point totals in the same way the presence of a disability does, even though they all fall under the umbrella of *underprepared*. A closer look at those who identified as having a disability in

the course ($n = 31$) finds 28 also indicated a need for remediation and 3 did not have English as a first language.

Hanover Research (2013) and Jaggars and Xu (2011) indicated students with disabilities do not perform at the same level as their peers, particularly in the online learning environment. This suggests that students with disabilities are categorized appropriately as underprepared, as they often need to remediate.

The insignificance between persistence and *Completion Tracking* was the most unexpected finding in the study. As mentioned, previous research indicated online courses have lower persistence rates than other modes of course delivery (Jaggars & Xu, 2011). This study had enrollment for online compared to face-to-face at roughly 1:2; however, the ratio of students who did not persist was 4:1 online to face-to-face. Although the number of non-persisting students was very small, this ratio is consistent with previous research.

When considering the use of *Completion Tracking* in the online and face-to-face courses based on the post hoc analysis, 92% of those enrolled in the online section of ANTH 1100 used the tool to some degree while only 60% of the face-to-face section used the tool. Some possible reasons may include students in the online course perceived some benefit from using the tool, or students accessing the online course for all lectures and activities saw the tool more frequently than face-to-face students who only accessed Moodle for the weekly quizzes. Alternatively, those who enrolled in the online course may also have been more inclined to use the tool since the demographics indicated 43 of the 48 online participants were domestic students, and national status played a significant difference in the use of the tool.

When analyzing the five students who did not persist, all of them identified with one of the risk factors associated with underpreparedness as previously suggested by the literature (Hanover Research, 2013; Jaggars & Xu, 2010; Mulvey, 2009). Due to the nature of the data collection tool, Moodle removed the *Completion Tracking* and point accumulation data from the system for any student who withdrew from the course. In the future, monitoring student logs on a weekly basis may provide further insights in how students who drop a course use the progress monitoring tools available to them.

Additionally, the SDL levels for these five students ranged from 77 to 96 which put them in the "high" SDL category. Recall two completed over 90% of the course, but did not take the final exam, the measure of persistence. It may be they determined their final grade was sufficient without the exam. The other three students who did not persist may have dropped the class for personal reasons not captured in this study.

Preparedness and self-directed learning did not have a significant relationship. This contrasts the results of Ley and Young (1998). One reason may be the bias in the sample. Institutional data suggested, on average, 30% of ANTH 1100 students had completed remediation courses in the three semesters prior to the study. Of the study sample, 70% reported being required to take remediation courses in the future, or had already completed them. The literature suggests academic success is related to self-directedness, yet the findings from this study do not support that assertion.

Implications for Practitioners

The relationship between disability and low SDL suggests to practitioners that these students need support in all academic courses, which was discussed by Mulvey (2009). These students' eligibility for college is not in question; rather the question is what

design elements an instructor should put into their course to provide structure and support while encouraging the development of self-directedness. Students with disabilities are required reasonable accommodations by law (Americans with Disabilities Act of 1990; Section 504 of the Rehabilitation Act of 1973). Providing opportunities for students to self-monitor in a structured way is one strategy to consider that would meet a need for accommodation as well. This would also support the larger discussion regarding students who require remediation and their lower SDL levels, although only disability was found to have a significant relationship with academic performance in this study. In the spirit of Universal Design for Learning, the scaffolds and instructional supports put into place for the students most at risk will continue to reinforce the achievement of all students.

Remedial courses focus on reinforcing math and English skills while also providing a learning environment that caters to the unique learning needs of these students. An underprepared student may not learn all the skills necessary to be a successful college student in one or two remedial courses; however, they are more likely to persist when compared to students with similar backgrounds not required to take remedial courses (Bettinger & Long, 2009). It then becomes incumbent for instructors at all levels of the college experience to reinforce executive functioning (progress monitoring) and SDL skills while ensuring their instructional practice is designed to maximize the growth of all their students, particularly in online courses (Jaggars & Bailey, 2010; Jantz, 2010).

Where does this leave *Completion Tracking* and instructional design for undergraduate courses built using a learning management system? The literature offers few suggestions regarding an easily implemented tool in the design of a course that

supports all students in personal progress monitoring. Based on the results of this study, the researcher advocates that *Completion Tracking* be a default setting for all courses built and delivered through Moodle both face-to-face and online. This study provides evidence that those students who are underprepared or identify with low self-directed learning skills use the tool when participating in online courses more than face-to-face courses. There is also evidence that while some students may not use the tool, the presence of the *Completion Tracking* did not have a negative effect on either performance or persistence.

Suggestions for Further Research

A future research study may be an investigation of personal progress monitoring tools that support both national and international students. This study had a high percentage of international students who were also significantly less likely to use the *Completion Tracking* tool. In the semester after this study was conducted, the institution experienced a decrease in enrollment for international students (-9.6%) and domestic students (-0.9%). The demographics of the ANTH 1100 course would likely have a different composition given the change in enrollment at the university overall and the historical international enrollment for the course. A replication of this study in the same course will likely have different results as the sample population had a high international presence. International students were not likely to use the *Completion Tracking* tool. As the university has had a decline in international enrollment, the composition of the course population will have a higher proportion of domestic students who tended to use the tool. There is no literature that provides insights into international students' personal progress monitoring behavior. Perhaps a brief training in the tool would also affect the outcomes.

This study found disability to have a significant negative impact on academic achievement. Further research exploring the impact of distinct types of disability is suggested.

The conditions of the experiment constrain the ecological validity of findings. For example, using *Completion Tracking* as a PPM delimits this study to this tool only; other PPMs or performance aids were not tested; thus the findings cannot be directly generalized back to all other forms of performance aids.

Another avenue to investigate would be the number of *Completion Tracking* boxes checked compared to the number of logins. This study used a discrete moment in time, taking the scheduled final exam, to measure persistence. A view of persistence in a more longitudinal way, such as the number of logins over time, may give greater depth to how students use the tool.

The *endowed progress effect* discussed by Nunes and Drèze (2006) may apply to *Completion Tracking*. Conditions for *Completion Tracking* can be set so boxes check automatically. Setting the first two boxes to be marked independent of the student may provide the motivation to complete the rest of the checkboxes. This study focused on creating a tool for students to control and monitor their own learning. An area for further research is the forced use of the tool under experimental conditions rather than the voluntary conditions of this study.

More research would be needed to be able to generalize the study to shorter time frames (eight-week courses), longer time frames (two-semester courses), as well as undergraduate students in upper division courses or graduate level students. As the participant demographics included many students who were underprepared, repeating the

study with other foundation courses and a different composition of prepared and underprepared students is also important. A correlational study for all students who use the tool across the campus would provide greater insights into who uses the tool and how it affects performance and persistence.

Additionally, qualitative research to explore the instructor and student perspectives would provide evidence to understand the implications of *Completion Tracking* as a personal progress-monitoring tool and instructional design element. A narrative approach to how prepared and underprepared learners use available instructional tools particularly in an online environment would also contribute to the body of research.

Conclusion

Universal Design for Learning principles and Self-Directed Learning theories provided the foundation for this research study. UDL advocates empowering students to monitor their own progress towards a goal to solidify executive functioning skills (Center for Applied Special Technology, 2013). SDL theory recognizes learner characteristics and instructional practices facilitate executive functioning skills (Song & Hill, 2007). A student enrolling in postsecondary coursework may be at any point on the SDL continuum from low skills to high skills. For this reason, an attempt was made to isolate a specific course design element available in an LMS that an instructor can easily implement, would benefit students with little direct instruction necessary, and would support executive functioning skills. The results indicated the tool, *Completion Tracking*, itself was not a significant factor in either achievement performance or persistence.

Additionally, a student may enroll in college courses unprepared for the academic and self-discipline required to achieve academic success. Included within the term

"underprepared" were the categories of remediation, presence of a disability, and English as a second language (Barbatis, 2010; Hanover Research, 2013; Jaggars & Xu, 2011). This study provides further evidence the presence of a disability negatively affected academic success measured by total points. Disability was also associated with lower SDL skills; however, this does not mean these students have lower academic ability. These students need different instructional strategies and supports to show evidence of their knowledge in university coursework.

The post hoc analyses also indicated course delivery had a significant association with SDL categories. Those in higher SDL categories were less likely to have a disability. Similarly, those within the highest SDL category were equally as likely to enroll in the face-to-face or online course, but those with in the medium to low SDL categories were more likely to enroll in the face-to-face course. This supports research that recognizes the challenges online courses present to students with lower SDL skills (Hanover Research, 2012) and the observation that online courses require more self-direction (Allen & Seaman, 2015).

National status, gender, and course delivery each had a significant relationship with *Completion Tracking* usage. Domestic students were much more likely to use the *Completion Tracking* tool as were females and students enrolled in the online course.

Underprepared students and the online learning environment will continue to present a challenge for instructors and will require further research for identifying effective instructional strategies. *Completion Tracking* as a course design tool supports the ability of students to monitor their own progress within a course and begin to increase self-directed learning skills for greater academic success and course persistence.

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APPENDIX A.

Universal Design for Learning Guidelines 2.0

Universal Design for Learning Guidelines

I. Provide Multiple Means of **Representation**	II. Provide Multiple Means of **Action and Expression**	III. Provide Multiple Means of **Engagement**
1: Provide options for perception 1.1 Offer ways of customizing the display of information 1.2 Offer alternatives for auditory information 1.3 Offer alternatives for visual information	**4: Provide options for physical action** 4.1 Vary the methods for response and navigation 4.2 Optimize access to tools and assistive technologies	**7: Provide options for recruiting interest** 7.1 Optimize individual choice and autonomy 7.2 Optimize relevance, value, and authenticity 7.3 Minimize threats and distractions
2: Provide options for language, mathematical expressions, and symbols 2.1 Clarify vocabulary and symbols 2.2 Clarify syntax and structure 2.3 Support decoding of text, mathematical notation, and symbols 2.4 Promote understanding across languages 2.5 Illustrate through multiple media	**5: Provide options for expression and communication** 5.1 Use multiple media for communication 5.2 Use multiple tools for construction and composition 5.3 Build fluencies with graduated levels of support for practice and performance	**8: Provide options for sustaining effort and persistence** 8.1 Heighten salience of goals and objectives 8.2 Vary demands and resources to optimize challenge 8.3 Foster collaboration and community 8.4 Increase mastery-oriented feedback
3: Provide options for comprehension 3.1 Activate or supply background knowledge 3.2. Highlight patterns, critical features, big ideas, and relationships 3.3 Guide information processing, visualization, and manipulation 3.4 Maximize transfer and generalization	**6: Provide options for executive functions** 6.1 Guide appropriate goal-setting 6.2 Support planning and strategy development 6.3 Facilitate managing information and resources 6.4 Enhance capacity for monitoring progress	**9: Provide options for self-regulation** 9.1 Promote expectations and beliefs that optimize motivation 9.2 Facilitate personal coping skills and strategies 9.3 Develop self-assessment and reflection
Resourceful, knowledgeable learners	**Strategic, goal-directed learners**	**Purposeful, motivated learners**

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APPENDIX B.

SDL Conceptual Model

SDL Conceptual Model

Song, L. & Hill, J. R. (2007). A conceptual model for understanding self-directed learning in online environments. *Journal of Interactive Online Learning*, *6*(1), 27–42. Used with permission.

APPENDIX C.

Permission to use PRO-SDLS

Permission to use PRO-SDLS

Emma Wood <woodemma@isu.edu>
To: Susan Stockdale <sstockda@kennesaw.edu>

Tue, Oct 14, 2014 at 9:32 PM

Thank you very much. I appreciate this. May I indicate that I have permission to use this survey for my study in my proposal? Do I need an "official" letter of permission?

Again, thank you,
Emma Wood

--
Emma Wood
Department of Teaching and Educational Studies (TES)
College of Education
921 South 8th Ave, Stop 8059
Idaho State University
Pocatello, Idaho 83209-8059
Education Bldg. 226B

Office: 208-282-5443
Calendar: Appointments

COE CPI Tutor Website

ALL students can learn!

[Quoted text hidden]

Susan Stockdale <sstockda@kennesaw.edu>
To: Emma Wood <woodemma@isu.edu>

Wed, Oct 15, 2014 at 8:26 AM

You may. Just use this email as your evidence.

Sent from my iPhone
[Quoted text hidden]

Emma Wood <woodemma@isu.edu>
To: Susan Stockdale <sstockda@kennesaw.edu>

Wed, Oct 15, 2014 at 8:40 AM

Thank you.

Sent from my T-Mobile 4G LTE Device

APPENDIX D.

PRO-SDLS Instrument

A Learning Experience Scale (PRO-SDLS)

Please check one answer for each statement. There are no "right" answers to these statements, which pertain to your recent learning experiences in college-not just those experiences from this class (although they may be the same).

ITEM	Strongly Disagree	Disagree	Sometimes	Agree	Strongly Agree
1. I am confident in my ability to consistently motivate myself.					
2. I frequently do extra work in a course just because I am interested.					
3. I don't see any connection between the work I do for my courses and my personal goals and interests.					
4. If I am not doing as well as I would like in a course, I always independently make the changes necessary for improvement.					
5. I always effectively take responsibility for my own learning.					
6. I often have a problem motivating myself to learn.					
7. I am very confident in my ability to independently prioritize my learning goals.					
8. I complete most of my college activities because I WANT to, not because I HAVE to.					
	Strongly Disagree	Disagree	Sometimes	Agree	Strongly Agree
9. I would rather take the initiative to learn new things in a course rather than wait for the instructor to foster new learning.					
10. I often use materials I've found on my own to help me in a course.					
11. For most of my classes, I really don't know why I complete the work I do.					
12. I am very convinced I have the ability to take personal control of my learning.					
13. I usually struggle in classes if the professor allows me to set my own timetable for work completion.					
14. Most of the work I do in my courses is personally enjoyable or seems relevant to my reasons for attending college.					
15. Even after a course is over, I continue to spend time learning about the topic.					
16. The primary reason I complete course requirements is to obtain the grade that is expected of me.					

ITEM	Strongly Disagree	Disagree	Sometimes	Agree	Strongly Agree
17. I often collect additional information about interesting topics even after the course has ended.					
18. The main reason I do the course activities is to avoid feeling guilty or getting a bad grade.					
19. I am very successful at prioritizing my learning goals.					
20. Most of the activities I complete for my college classes are NOT really personally useful or interesting.					
21. I am really uncertain about my capacity to take primary responsibility for my learning.					
22. I am unsure about my ability to independently find needed outside materials for my courses.					
23. I always effectively organize my study time.					
24. I don't have much confidence in my ability to independently carry out my student plans.					
25. I always rely on the instructor to tell me what I need to do in the course to succeed.					

APPENDIX E.

Three-Factor Questionnaire

Three-Factor Questionnaire

1. Is English your primary language? Yes   No

2. Have you taken or will you take one of the following courses: (ENGL 1101P,

    MATH 0025, MATH 0097, MATH 0098)? Yes   NO   I Don't Know

3. Do you have a disability that may affect your success in this class?

    - Learning Disability (i.e., dyslexia, dysgraphia)

    - Traumatic Brain Injury

    - Mood or Behavioral Disability (i.e., anxiety, depression, PTSD, or autism)

    - Sensory Disability (i.e. vision or hearing loss)

    - Physical Disability (i.e., cerebral palsy, use a wheelchair, prosthetic)

    - None