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## Motivation, Persistence, and Achievement in Community College Asynchronous Online Courses

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**MOTIVATION, PERSISTENCE, AND ACHIEVEMENT IN COMMUNITY  
COLLEGE ASYNCHRONOUS ONLINE COURSES**

by

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## **ABSTRACT**

### **MOTIVATION, PERSISTENCE, AND ACHIEVEMENT IN COMMUNITY COLLEGE ASYNCHRONOUS ONLINE COURSES**

Rachel Michelle Desmarais  
Old Dominion University, 2015  
Director: Dr. Gary M. Morrison

Community college students enrolled in asynchronous online courses were examined for the correlational effects of motivation factors upon achievement and persistence in major and non-major courses. A modified version of the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1991) was employed to obtain measurements on motivation and self-regulatory factors. Demographic factors and first generation student status were used to determine any interaction effects.

A series of binary logistic regressions demonstrated significant, positive correlations between self-efficacy and modified MSLQ task value on persistence for these students. A series of ordinal logistic regressions demonstrated significant, positive correlations between self-management behaviors, major course task value, and an interaction effect between the two on achievement. Two difference measures of task value showed differing results on persistence and achievement, implying that they may be measuring two different components of task value. There was no significant relationship noted in this sample for the motivation construct as a whole, and none of the

demographic factors significantly moderated task value's or motivation's effects on persistence or achievement.

The results of this study suggest that previously researched effects of self-efficacy and task value on persistence and achievement can be generalized to the asynchronous online community college student. Additionally, there is evidence that the construct of task value could be further divided to articulate the differences in interest and perceived value. Instructional design and policy modifications are suggested to aid the asynchronous online learner based on the results of this study.

*Keywords:* asynchronous, online, persistence, achievement, motivation, self-management, self-regulation, self-efficacy, task value, community college, MSLQ

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This dissertation is dedicated to my family who probably gave as much as I did in this process. I couldn't have done it without them.

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## CHAPTER I

### INTRODUCTION AND LITERATURE REVIEW

#### Introduction

Nearly one-third of all higher education students in the United States have taken an online course (Allen & Seaman, 2011). While the explosive growth of online courses seems to have slowed in recent years, questions of success and persistence in academic courses still remain. According to recent reports, retention rates in online community college courses average as much as 8 to 10% lower than face-to-face counterparts (Instructional Technology Council, 2013; "Reports and Resources," 2011). Studies have suggested that there is no significant difference in the delivery of an online course versus a traditional face-to-face (F2F) course, but there are wide differences in course success in both delivery systems, arguably contingent upon instructional methodology (Bernard et al., 2004).

Historically, the most studied models of retention in post-secondary education have been formed around the "traditional" full-time student taking courses in an F2F format at a four-year college or university. Tinto's (1975) longitudinal model of retention has formed the basis of most traditional models. This model is based on factors of student characteristics as well as academic and social integration into college. Eventually, modified or new models also took into consideration the non-traditional university student and the community college student (Bean & Metzner, 1985; Pascarella, Smart, & Ethington, 1986; Terenzini & Pascarella, 1980). Perhaps the least studied, but gaining in

interest, has been a model for persistence and success in online education (Kember, 1989; Rovai, 2002).

Recent persistence and retention research in online courses has focused on student characteristics, student demographics, and course characteristics (Lee & Choi, 2010). While there are some variables of disagreement, several characteristics of less successful students have begun to gain empirical support. For example, male students tend to persist at lower rates than female students (Cochran, Campbell, Baker, & Leeds, 2013). In certain situations, blacks tend to persist at higher levels than non-blacks (Cochran et al., 2013), and there is growing evidence that basic computer skills are a vital component of success (Aragon & Johnson, 2008; Harrell & Bower, 2011). Other variables such as age and financial aid receipt are less clear in their effect on persistence in online courses (Aragon & Johnson, 2008; Patterson & McFadden, 2009; Simpson, 2006). Regardless, these studied variables explain only a small portion of the variance in online course persistence and success. Course characteristics are a little clearer in their impact. According to a recent meta-analysis, course designs which support interactions between students and with the course content positively affect student learning (Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011). Of particular interest are course characteristics which support student motivation and self-regulation.

In recent psychology research, motivation has emerged as a salient factor in academic achievement (Eccles & Wigfield, 2002; Pintrich, 2003). The motivational constructs of academic goals, academic self-efficacy, and academic skills/tools have been suggested to have the most impact on retention in traditional face-to-face college courses (Robbins et al., 2004). In other words, students who set goals believe that they can be

successful, and have the academic tools such as time management, study skills, and communication skills are more likely to be retained.

Several theoretical models for motivation exist and much research has been conducted on different motivation questions, yet there is a dire lack of integration with these models. This lack of integration is problematic for others employing motivation as a component of their research. As such, the present study will work from a theoretical base linking modern expectancy-value theory with self-regulation. The expectancy-value framework has been studied in an academic persistence context (Artino & McCoach, 2008; Cho & Summers, 2012; Pintrich, 2003). A survey tool for measuring motivation, the Motivated Strategies for Learning Questionnaire (MSLQ) developed out of a modified modern expectancy-value framework (Pintrich, Smith, Garcia, & Mckeachie, 1993) provides a basis for research comparison.

Modern expectancy-value theory has two main components: expectancy and task value. Expectancy can be thought of as the belief that a person has that he or she will do well on a task (Eccles & Wigfield, 2002). Other ways of articulating the concept of expectancy are self-efficacy, beliefs about control, and beliefs of personal competence, but the overlying theme is the degree to which a person believes they can successfully complete a task and are personally responsible for their own performance (Pintrich & De Groot, 1990). Learners who believe in their competence within a particular knowledge domain have greater persistence and better achievement (Eccles & Wigfield, 2002). The value of a task is linked to a learner's goals and beliefs about the significance of the task. Task value can be articulated as intrinsic interest as well as the degree of intrinsic versus extrinsic value and the juxtaposition of learning versus performance goal orientation.

Learners who utilize a learning orientation and find interest, challenge, and importance in a task are much more likely to persist (Pintrich & De Groot, 1990). The modification to the expectancy-value framework is in the form of affective reactions to the task at hand – namely anxiety. According to Pintrich and DeGroot (1990), test anxiety in particular may have a relationship with the expectancy and value components of motivation.

The study of motivation is not complete without considering the idea of self-regulation. Self-regulation as a construct pulls together those actions of planning, observing, controlling, and adjusting one's thought processes and behaviors in order to reach a specific goal (Pintrich, 2003). It can be thought of as the actionable part of motivation. Research on self-regulated learning (SRL) strategies has shown that learners who engage in these strategies are more likely to remain motivated and achieve their set goals (Zimmerman, 2008), yet there is still much to study about the variety of strategies available to learners and how learners adopt these strategies (Pintrich, 2003).

Examination of motivation and academic skills in distance education formats has yielded conflicting results in persistence studies (Holder, 2007; Park & Choi, 2009; Richardson, 2006). It is unclear just how much variance motivation accounts for in online persistence models as well as how the different sub-constructs of motivation interact with one another and with other student characteristics in an online persistence model. Furthermore, differences in community college and university students may add yet another layer of complexity in motivation - persistence research in online settings. The focus of this research is to examine the interactions between and effects of student characteristics, course characteristics, and motivational factors on successful retention in community college online courses.

## Literature Review

### Theoretical Models

**Retention Models.** Retention research in higher education began in earnest during the 1970s. Perhaps the most widely known theory of retention is the longitudinal Tinto (1975) model. Tailored more for the traditional college or university student, this model included student factors such as demographics, personal characteristics, prior academic experience, and motivation, as well as social and institutional characteristics of the college. Tinto (1975) defined motivation in terms of goal commitment for completing college and reasoned that a student's goals were most likely related to their values, which in turn were affected by family and previous educational experiences. Subsequent testing of Tinto's model found no direct effect of student characteristics on retention, but did find support for interaction effects of student characteristics on post-enrollment college experiences. In comparison, social and academic integration had more direct effect on retention than student characteristics (Terenzini & Pascarella, 1980).

Further study of retention led to a variety of other models, many of which were based on Tinto's model. Of particular importance to this study are the models (Bean & Metzner, 1985; Pascarella et al., 1986) adapted for consideration of the community college student. Community college students are typically non-traditional commuter students from a very diverse background, and the majority of community college students attend college part-time (American Association of Community Colleges, 2013). While Tinto's model was generally applicable to community college retention, the greatest difficulty lay in the construct of social integration, as campus socialization is not characteristic of part-time commuting students (Bean & Metzner, 1985). As a result, the

Bean and Metzner's (1985) community college model of retention reduced the importance of social integration and increased the effects of family and outside commitments on retention.

Similarly, online retention models attempted to modify Tinto's original model in terms of outside commitments (such as work and family) for the distance learner (Kember, 1989). Like community college learners, distance learners tend to be non-traditional in terms of age, work commitment, academic experience, and distance from a physical campus. In particular, Kember's (1989) model stresses the importance of outside commitments and reduces the importance of social integration in online learning retention. Conversely, some theoretical frameworks suggest that the lack of social integration in a distance learning environment due to physical and temporal separation of the learners and instructor may be the very thing that is affecting retention in the online setting (Rovai, 2002). Nevertheless, one of the areas in all these retention models that has remained consistent has been that of motivation.

**Motivation Models.** Theories of motivation are plentiful, tend to have different names for similar constructs, and sometimes use the same names for slightly different constructs (Schunk, 2000). Motivational science in general has a dire need for theoretical integration in order for others to utilize these theoretical models more effectively in their social science research. In more recent years, there has been an effort to combine theoretical perspectives (Eccles & Wigfield, 2002; Murphy & Alexander, 2000). Generally speaking, motivation theories can be divided into four general categories: 1) expectancy theories which include self-efficacy theory and control theory, 2) value theories which include intrinsic motivation theories, interest theories, and goal theories,



3) combined expectancy and value theories which include attribution theory, modern expectancy-value theory, and self-worth theory, and 4) motivation theories incorporating cognition and/or self-regulation (Eccles & Wigfield, 2002)

Pintrich's (2003) theory of motivation and self-regulation can be considered as a member of this fourth category. This model is based on Eccles and Wigfield's (2002) version of modern expectancy-value theory, but also includes self-regulation. The expectancy portion of the model reflects a learner's beliefs about how well they can perform a task in a specific domain and is similar to Bandura's (1997) construct of self-efficacy. The value portion of the model reflects the value of a task as perceived by the learner. Eccles and Wigfield (2002) divide task value into four separate factors. First, the value of a task depends on the degree of importance the learner places on doing the task. Second, task value depends on the degree of enjoyment the learner receives from doing the task. This factor is very similar to the construct of intrinsic motivation (Deci & Ryan, 2000). Third, task value is dependent upon the perceived utility value of the task itself. In other words, this task may not necessarily be enjoyable or interesting, but it can be related to an important future goal. Task value is somewhat similar to the idea of extrinsic motivation (Deci & Ryan, 2000) in the sense that it may be a means to an ends. Fourth, task value depends on the cost of engaging in the task. This value is the negative value attributed to engaging in the task. For example, effort expenditure, lost opportunities, and performance anxieties are examples of task value cost. Together, expectancy and value pose the question of how learners' ability beliefs influence individual task values and contribute to motivation. The addition of self-regulation in the theoretical model forms the "action" part of motivation.

## Research

**Online retention research.** Factors which influence retention in online higher education courses and programs have been categorized into student factors, course or program factors, and environmental factors. Significant learner-related retention factors include learners' previous academic performances, learning skills, psychological attributes, and the amount of previous work experience related to the course of study. In terms of course or program factors, the instructional design of the course and institutional support provided for the learner in the course are also significant contributors to retention. Work environment and outside support are noted as critical environmental factors (Lee & Choi, 2010). A majority of online retention research has been conducted in the college and university setting, leaving two-year institutions such as community colleges and technical schools under-studied.

***The distance student.*** Research in online retention has focused on the distance students themselves – what makes a successful distance student? Studies attempting to classify successful and non-successful distance students have generated a profile that explains a small amount of variation in retention. For example, high school GPA continues to be a strong predictor of success in online courses (Aragon & Johnson, 2008; Dupin-Bryant, 2004; Morris, Wu, & Finnegan, 2005). Like their counterparts in classroom instruction, students who have completed more credit hours in online courses are also more likely to be retained (Aragon & Johnson, 2008; Boston, Ice, & Gibson, 2011; Simpson, 2006). Gender has been shown to be a small factor in retention, (Aragon & Johnson, 2008; Simpson, 2006) and ethnicity has been shown to have moderate predictive qualities in terms of retention (Desmarais, Yen, & Morrison, 2013)

There is growing evidence that age (Patterson & McFadden, 2009; Simpson, 2006) and ethnicity (Ashby, 2004; Patrick, 2001; Patterson & McFadden, 2009) may be a factor in online retention. Also, more studies are suggesting that some basic competency with computers and internet access are also factors (Aragon & Johnson, 2008; Dupin-Bryant, 2004; Osborn, 2001).

An area getting mixed results is that of learner socio-economic status. Typically measured by self-report or receipt of financial aid, this variable's correlation with retention is unclear. Studies range from a positive correlation with retention (Simpson, 2006) to no significant difference (Aragon & Johnson, 2008) to a negative correlation (Desmarais et al., 2013). Differences noted in the preceding studies could be due to differences in type of student (four-year versus community college) and environment (European education system versus American education system) or sample size.

***Online programs and courses.*** Research in online retention has also tended to compare online course performance with performance in traditional classroom instruction courses. The course delivery medium should not be the focus of attention; rather, the questions should center around “what works” and “how” in education at a distance (Abrami et al., 2011). A meta-analysis of over 200 studies provided inconclusive results with a net effect size of zero and wide variability in individual contributing results (Bernard et al., 2004). Clearly, in some studies, the favor was for distance education whereas in others classroom instruction fared better. These disparities could be due to instructional design issues including quality application of multi-media learning principles, learning strategies, instructional strategies, and motivational principles

(O'Neil, 2005). In other words, distance education courses should not be digital copies of face-to-face courses (Morrison & Anglin, 2006).

In the design of distance education programs and courses, planned interaction is crucial for learning success (Keegan, 1996). Moore (1989) classified interaction into three distinct types: student-instructor interaction, student-content interaction, and student-student interaction. Student-instructor interaction occurs when the student and the teacher correspond with one another, either synchronously (such as telephone or live chat sessions) or asynchronously (such as email or discussion forums). Likewise, student-student interaction occurs when students correspond with each other in asynchronous or synchronous fashion. Student-content interaction involves the student relating to the course subject material in such a way to construct meaning. Examples of student-content interaction include reading a text, viewing instructional videos, or participating in an electronic simulation. A recent meta-analysis examining interaction in distance education suggested that student learning was more strongly affected by student-content and student-student interaction than by student-instructor interaction (Bernard et al., 2009). Indeed, other researchers have found positive correlation with social presence and participation and retention in online courses (Finnegan, Morris, & Lee, 2009; Liu, Gomez, & Yen, 2009; Muilenburg & Berge, 2005).

***Environment.*** Environmental variables comprise the third category of retention factors noted in the literature. Work factors are one sub-category of environment variables. Many online students work either part-time or full-time, and these demands can place a burden on continued studies (Lee & Choi, 2010). Changes in work status or work load can negatively affect a student's learning environment as can changes in a

family member's employment. The second sub-category of environment variables is the support structure.

If a learner's support structure is not solid, then persistence may be affected. Examples of learner support include ability to afford the education, childcare for parent students, time to study, and emotional support (Lee & Choi, 2010). When one or more of these structures is weak or not present, then dropout potential increases.

The previous distance education retention/persistence factors also outline potential circumstances that would affect the motivation of a learner. For example, the learner who has difficulty securing the funds to attend college (environmental variable), has not performed well in the past academically (student-self variable), and who has been previously enrolled in a poorly designed online course (program/course variable) may become de-motivated to persist with their educational endeavors.

**Motivation research.** As noted earlier, this review of motivation research focuses on the expectancy-value model of motivation but also references research in similar structures noted in other models of motivation where relevant. It also incorporates self-regulation research as it connects motivation with action. Research is reviewed by type of construct: expectancy (student's belief that they can complete the assignment), value (student's beliefs about and goals regarding the assignment), and self-regulation (student's ability to monitor and control cognitive and behavioral strategies related to successful completion of the task.)

**Expectancy.** Research in the area of self-efficacy and competency beliefs support the idea that when students expect to do well, they tend to expend more effort, stay with

tasks longer, and generally perform better (Bandura, 1997; Robbins et al., 2004; Wigfield et al., 1997) A meta-analysis of 39 studies measuring the relationship of self-efficacy to academic achievement and/or persistence yielded an effect size of .38 for achievement and .34 for persistence (Multon, Brown, & Lent, 1991). Self-efficacy was estimated to account for approximately 14% and 12% of variance in student achievement and persistence respectively. An interesting moderating factor in this meta-analysis was that of student age: high school and college student students had larger achievement effect sizes than younger students. This evidence suggests that older students make a more accurate assessment of their own self-efficacy.

Another meta-analysis of 109 studies on psychosocial and study skill factors of college students arrived at similar conclusions which found an effect size of .36 for academic self-efficacy on persistence (Robbins et al., 2004). Indeed, the results of this meta-analysis suggested that the effects of academic self-efficacy on retention and achievement were large enough to be considered salient factors along with grade point average (GPA) and performance on standardized exams.

*Value.* The more value a student places on a learning task, the more likely they will persist and subsequently choose to engage in future similar tasks (Eccles & Wigfield, 2002; Feather, 1992; Robbins et al., 2004). Value can be articulated in terms of the personal importance the student places on the task. It can be articulated as the personal enjoyment a student derives from the task. It can also be expressed as the relationship between the task at hand and future goals such as employment, or it can be expressed in terms of cost to perform the task. For this reason, it has been said that the research community knows the least about this component of motivation (Eccles & Wigfield,

2002). In a longitudinal study of unemployment and job seeking beliefs and behaviors of 320 individuals, Feather and O'Brien (1987) found that value as assessed through the lens of "need" and "commitment" predicted job-seeking behaviors. This positive correlation speaks to persistence of job seekers.

Students who are more personally interested in a task, whether through intrinsic personal interest or situational interest, tend to demonstrate higher levels of engagement and achievement (Hidi & Harackiewicz, 2000). A meta-analysis of 121 interest studies conducted after 1965 presented a correlation of .40 between interest and achievement (Schiefele, Krapp, & Winteler, 1992). There were no statistically significant differences between interest and achievement controlling for school subject or discipline, but there were differences noted for gender. Males were statistically more likely to have achievement scores affected by interest when compared to females.

Students who are pursuing goals with the intent of mastering tasks for the purposes of learning new skills (perhaps for future employment), understanding, or general self-improvement tend to be more motivated and have higher achievement scores than those students who are pursuing goals out of general competitiveness or comparison reasons (Ames, 1992; Dweck & Leggett, 1988). While goals are not really values in and of themselves, there is some evidence that they are related in that values provide reasons to pursue goals (Wentzel, 2000). This value – goal relationship could be thought of as relevance. In a study (Means, Jonassen, & Dwyer, 1997) examining intrinsic relevance of material to students, researchers manipulated learning materials by providing extrinsically relevant goal-orientation and familiarity interventions to students. Examples of goal-orientation strategies included expressing the utility value of the material and the

instruction, as well as articulating the future usefulness of the material to the student. Familiarity strategies included concrete examples, context through familiar scenarios, and the use of human interest stories. Not only did the researchers find evidence to support the idea that relevant materials are more motivating and leads to higher achievement, they also found that relevance could be positively manipulated through the use of external, extrinsic strategies. This finding was especially true for students who were not initially interested in the subject or task (Means et al., 1997).

***Self-regulation.*** Students who set goals or make plans and attempt to monitor their cognitive processes in pursuit of these goals in addition to aligning their behavior with the desired outcome are more likely to have better achievement (Pintrich, 2000; Zimmerman, 2008). For example, Azevedo and Cromley (2004) conducted a quasi-experimental study examining the effects of self-regulatory training on achievement in a web-based, media-rich environment. Students receiving a 30 minute training session on self-regulation techniques of planning, monitoring, learning strategies, time management, and interest scored significantly better on post-tests than the control group. Other affective, motivational, and developmental elements likely influence the use or non-use of self-regulatory behaviors (Azevedo, Moos, Johnson, & Chauncey, 2010).

**Motivation research in online settings.** Much of the motivation research in online education settings has studied the effect of motivation on achievement; very little has focused independently on motivation and persistence. Three studies in the past 10 years have specifically examined online persistence and motivation (Holder, 2007; Lee, Choi, & Kim, 2013; Park & Choi, 2009). The first was a correlational survey study of 259 associate, bachelor, and master's degree students (Holder, 2007). The survey



questions were categorized into 12 different subcategories: pathways (strategies for accomplishing goals); agency (motivation to use strategies to accomplish goals); time and study management; metacognitive self-regulation; learner autonomy; computing self-confidence; financial support; emotional support; intrinsic goal orientation; end goal orientation, learner self-efficacy; and learner compliancy. Only emotional support, self-efficacy, and time management were positively correlated in a statistically significant way with persistence. Learner autonomy was negatively correlated with persistence. Together, these four variables made up 9% of the total persistence variance – a very slight effect.

A more recent correlational study of 147 post-secondary learners examined student characteristics, organizational support, familial support, satisfaction, and course relevance in terms of persistence (Park & Choi, 2009). Results indicated that perceived organizational support and perceived course relevance were significant predictors for persistence. Another correlational study of 169 students explored the relationship of learners' internal characteristics, external support structures, and skills for learning to academic persistence (Lee et al., 2013). Of the five contributing discriminatory factors in these three categories, meta-cognitive self-regulation accounted for the greatest variance overall with locus of control being the only other discriminator. Together, these two variables explained 7% of the variance in persistence overall. The other three variables: time and study management, self-efficacy, and family/work support were non-significant.

Other research of motivation and persistence/retention in online settings is implicitly included in the research on motivation and achievement. Students who do not

achieve either failed or did not persist. The remainder of this section describes the various motivational constructs from an achievement point of view.

**Expectancy.** Like the general research on self-efficacy in academic settings, self-efficacy in online settings is correlated with persistence and achievement (Cook, Thompson, & Thomas, 2011; Radovan, 2011; Richardson, 2006). A study of 395 students at the Open University in the United Kingdom demonstrated a correlation of 0.40 between self-efficacy for learning and achievement and a 0.40 correlation when controlling for age, gender, and entrance examination qualifications (Richardson, 2006). Self-efficacy for learning has also predicted preference for the online mode of instruction in another study (Clayton, Blumberg, & Auld, 2010). Other researchers have tested for self-efficacy in the use of technology in online settings with mixed results. DeTure (2004) and Puzziferro (2008) found no significant correlation between technology self-efficacy and achievement, but Wang, Shannon and Ross (2013) found a moderate correlation of 0.21 between the two variables.

**Value.** Distance education studies on task value produce similar results to those of classroom studies (Artino & Jones, 2012; Artino, 2009). A research study investigating learners' individual perceptions about the learning environment and context in an online aviation course revealed that aviation majors reported higher levels of task value, but no achievement difference was noted between aviation majors and non-majors (Artino, 2009). While no statistically significant direct link between task value and achievement has been noted in recent literature, a significant correlation between task value and self-regulatory behaviors has been found (Artino & McCoach, 2008). In a study examining intrinsic motivation and goal orientation, Simons, DeWitte, and Lens (2004) found a

statistically significant correlation between intrinsic motivation and task orientation and between goal orientation and task orientation. Moreover, intrinsically motivated and goal-oriented (future value) students performed better than externally motivated students.

*Self-regulation.* One study with a fairly large sample of 815 community college students in online environments found a statistically significant relationship between self-regulation behaviors and achievement (Puzziferro, 2008). This study found a positive correlation between the two regulation factors of time/study management and effort regulation and final grade. The Artino (2009) study referenced earlier also found more use of cognitive self-regulatory strategies for aviation majors in the aviation course; however, they did not find an achievement difference between majors and non-majors. This lack of results could have been due to the type of assessment used in the course (namely multiple choice), or it could have been due to the mastery learning approach employed in the course. There was no correlation between self-regulated behavior and achievement. Although this next finding does not fit in any of the three aforementioned motivation constructs, one general comment is necessary. With a sample of 581 residential college freshman, Allen (1999) found evidence of a link between motivation operationalized as the desire to finish college and persistence for some groups of students. In this study, those groups were an ethnic minority. Similarly, it has been hypothesized that learner self-regulation could change over time since it tends to be partially contingent upon environmental factors; however, a recent study of first-generation online learners was not able to substantiate that claim (Barnard-Brak, Paton, & Lan, 2010).

## **Purpose**

Several gaps exist in the literature of motivation and self-regulation in asynchronous online environments. The study of self-efficacy in online settings has yielded mixed results for course completion. Likewise, there is a discrepancy of findings for the effect of self-regulation on achievement. Theoretically, task value is important to the motivation construct, and there is some evidence that task value has a direct relationship with persistence. The related concept of interest may have some relationship with achievement, but little is understood about the effects of task value and interest on achievement. Therefore; the purpose of this study is to explore the effects of motivation on persistence and achievement in online community college courses. More specifically, research questions include:

1. How does students' self-efficacy predict their persistence in online courses?
2. How does students' task value predict their persistence in online?
3. How does students' self-efficacy and task value predict their persistence in online courses?
4. How will each of the student characteristics (i.e., gender, ethnicity, first generation college status, motivation, and self-regulation) moderate the relationship between students' task value and their persistence in online courses?

5. How will each of the student characteristics (i.e., gender, ethnicity, first generation college status, motivation, and self-regulation) moderate the relationship between students' task value and their achievement in online courses?
6. How do students' self-regulation predict their achievement in online courses?
7. How does students' task value predict their achievement in online courses?
8. How do students' self-regulation and task value predict their achievement in online courses?
9. How does each of the student characteristics (i.e., gender, ethnicity, first generation college status, and reports of self-regulation) moderate the relationship between students' motivation and their persistence in online courses?
10. How does each of the student characteristic (i.e., gender, ethnicity, first generation college status, and reports of self-regulation) moderate the relationship between students' motivation and their achievement in online courses?

## CHAPTER II

### METHOD

#### **Design and Sample**

This non-experimental correlational study examined the effects of motivation on persistence and achievement in a community college setting. Participants were students who enrolled in asynchronous online college-credit courses at a mid-sized suburban community college in the southeast during the academic fall semester of 2014.

**Participants.** The participant pool was composed of approximately 320 students from asynchronous online courses. The general college population statistics report a 60/40 split between female and male students and an almost even split between part-time and full-time students. The average student age was 28 years old. Approximately 56% of the general student population was White, 32% was Black (non-Hispanic), and 6% was Hispanic. The asynchronous online student sample consisted of 86 students who agreed to participate in the study. Just over 74% of the participants were female, and approximately 26% of the participants were male. This sample contained more female students than the general population. Just over 68% of the students in the sample were White; just over 18% were Black; and almost 13% were Hispanic. The percentage of Black and Hispanics in this sample deviated from the college population statistics.

**Courses.** The courses examined in this study were delivered completely online and were asynchronous in nature. Courses selected for this study were drawn from the college's online programs in Associate in Arts College Transfer, Business, Information Systems (and related), Criminal Justice, and Logistics. A mixture of courses classified as

required domain subjects for a major and general education or elective courses were included. Two sections each of a math, English, psychology, chemistry, business, logistics, computer, and criminal justice course were selected for the participant pool. The participants in this study were split evenly between those taking a course to fulfill their major of study and those who were taking a general education elective.

### **Instrumentation and Variables**

**Instrumentation.** The MSLQ was developed in the late 1980's to measure the motivation and learning strategy regulation of students (Pintrich, Smith, & McKeachie, 1991). This self-report questionnaire includes six motivation scales: (a) intrinsic goal orientation, (b) extrinsic goal orientation, (c) task value, (d) control beliefs, (e) self-efficacy for learning and performance, and (f) test anxiety. It also includes nine learning strategy scales: (a) rehearsal, (b) elaboration, (c) organization, (d) critical thinking, (e) metacognitive self-regulation, (f) time and study environment, (g) effort regulation, (h) peer learning, and (i) help seeking. Original factor validity testing by confirmatory factor analysis showed the instrument to be suitably reliable, and Cronbach's alphas ranged from 0.52 to 0.93.

The MSLQ has become a widely-used tool in motivation research, and recent studies have examined its use in asynchronous online settings (Artino & McCoach, 2008; Cho & Summers, 2012). The results of these studies suggest that the motivation scales have a marginally reasonable model fit for asynchronous online environments, and the learning strategy scales do not have a reasonable fit. Exploratory factor analysis performed on the motivation portion of the MSLQ in the Cho and Summers (2012) study suggested a better fit with five factors recomposed from the original six when conducted

in asynchronous online environments. Together, these five factors explained just over 60% of the variance with Cronbach's alphas ranging from 0.65 to 0.91. While the original MSLQ contained nine factors in the learning strategies section, exploratory factor analysis in the Cho and Summers study suggested a retooling to four factors which explained over 44% over the variance. Internal consistency estimates for these factors ranged from 0.82 to 0.91. Table 1 shows the reconstructed factors as suggested by the Cho and Summers study. This study employed the modified version of the MSLQ as suggested by Summers and Cho for asynchronous learning environments. Their adaptation reduces the number of total questions from 81 to 65 and classifies the questions into 9 rather than 15 factors. This researcher further changed the wording of the original questions number 33 and 73 to reflect learning through a class website as opposed to attending class. The full adaptation of the modified MSQ used for this study can be found in Appendix A.

**Variables.** Aside from the nine components of motivation and learning strategies measured by the modified MSQ, other independent variables included student gender, ethnicity, age, and first generation college student status. Student major was also collected to determine if the course under study was a required elective or mandatory core course for each student's major. Mandatory core courses are another way of measuring potential interest and task value. Table 2 outlines the four research questions and their accompanying variables. Dependent variables will include persistence as measured by whether or not the student withdrew from the course, and achievement as measured by the course final grade.



Table 1

*Modified MSQF Factors*

Modified Factor	Original Question Numbers	Original Factor(s)
Task Value	4	TV
	10	TV
	17	TV
	22	IGO
	23	TV
	26	TV
	27	TV
	Text Anxiety	3
8		TA
14		TA
19		TA
28		TA
Self-efficacy	5	SE
	20	SE
	21	SE
	29	SE
	31	SE
Intrinsic Goal Orientation and Control of Learning	1	IGO
	6	SE
	9	CL
	15	SE
	16	IGO
	25	CL
Extrinsic Goal Orientation	7	EGO
	11	EGO
	13	EGO
	30	EGO

Table 1 Continued

Modified Factor	Original Question Numbers	Original Factor(s)
Learning Strategies for Reading	38	CT
	41	MSR
	42	ORG
	47	CT
	51	CT
	53	ELA
	54	MSR
	61	MSR
	62	ELA
	64	ELA
	66	CT
	69	ELA
	71	CT
	76	MSR
81	ELA	
Learning Strategies for Course Material	32	ORG
	34	PL
	36	MSR
	39	REH
	49	ORG
	55	MSR
	63	ORG
	67	ELA
72	REH	
Self-management	33	MSR
	37	ER
	43	TSE
	52	TSE
	60	ER
	70	TSE
	73	TSE
	74	ER
	77	TSE
	80	TSE

Table 1 Continued

Modified Factor	Original Question Numbers	Original Factor(s)
Interaction	45	PL
	50	PL
	68	HS
	75	HS

*Note.* Modifications are based on Cho and Summers (2012). Original question numbers are those assigned in the original version of the MSQ (Pintrich, Smith, & McKeachie, 1991). Original categories: CL = Control of Learning, CT = Critical Thinking, EGO = Extrinsic Goal Orientation, ELA = Elaboration, ER = Effort Regulation, HS = Help-seeking, IGO = Intrinsic Goal Orientation, MSR = Meta-cognitive Self-regulation, ORG = Organization, PE = Peer Learning, REH = Rehearsal, SE = Self-efficacy, TA = Test Anxiety, TSE = Time and Study Environment, and TV = Task Value.

Table 2

*Research Questions with Accompanying Variables*

Research Question	Variables Used	
	Dependent	Independent
1. How does students' self-efficacy predict their persistence in online courses?	Persistence (Yes/No)	Self-efficacy sub-scale score
2. How does students' task value predict their persistence in online courses?	Persistence (Yes/No)	a) Type of course (elective or core) b) Task value sub-scale score
3. How does students' self-efficacy and task value predict their persistence in online courses?	Persistence (Yes/No)	a) Self-efficacy sub-scale score b) Type of course (elective or core)
4. How will each of the student characteristics (i.e., gender, ethnicity, first generation college status, motivation, and self-regulation) moderate the relationship between students' task value and their persistence in online courses?	Persistence (Yes/No)	a) Task value (major course) b) Type of course (elective or core) c) Sub-scaled motivation scores d) Gender e) Ethnicity f) First generation college student g) Sub-scaled self-regulation scores
5. How will each of the student characteristics (i.e., gender, ethnicity, first generation college status, motivation, and self-regulation) moderate the relationship between students' task value and their achievement in online courses?	Final course grade	a) Task value (major course) b) Type of course (elective or core) c) Sub-scaled motivation scores d) Gender e) Ethnicity f) First generation college student g) Sub-scaled self-regulation scores

Table 2 Continued

Research Question	Variables Used	
	Dependent	Independent
6. How does students' self-regulation predict their achievement in online courses?	Final course grade	Self-regulation sub-scale score
7. How does students' task value predict their achievement in online courses?	Final course grade	Task value (major course)
8. How do students' self-regulation and task value predict their achievement in online courses?	Final course grade	a) Self-regulation sub-scale score b) Task value (major course)
9. How does each of the student characteristics (i.e., gender, ethnicity, first generation college status, and reports of self-regulation) moderate the relationship between students' motivation and their persistence in online courses?	Persistence (Yes/No)	a) Sub-scaled motivation b) Gender c) Ethnicity d) First generation college student e) Self-regulation sub-scale score
10. How does each of the student characteristic (i.e., gender, ethnicity, first generation college status, and reports of self-regulation) moderate the relationship between students' motivation and their achievement in online courses?	Final course grade	a) Sub-scaled motivation b) Gender c) Ethnicity d) First generation college student e) Self-regulation sub-scale score

Student demographic information, academic major, withdrawal status, and final grade were requested from the college's student information system. The nine motivation and learning strategies factors as well as the first generation college student status were collected by survey.

### **Procedures**

After securing Institutional Review Board approval and consent from individual instructors, students in the 16 course sections were informed of the study and asked to participate. Participants were offered an individualized feedback report of their modified MSQ results as an incentive to participate in the study (see Appendix B for feedback report template). Participating students received the survey in week 6 of the 16 week semester and were asked to complete the survey by the end of week 7 in the college's learning management system. There is no consensus as to when the MSQ should be given, as studies have placed it at the beginning, middle, and end of course instruction (Artino & McCoach, 2008; Cook et al., 2011; Holder, 2007; Pintrich & De Groot, 1990; Richardson, 2006). The creators of the MSQ chose to deliver the survey in the middle of the course (Pintrich & De Groot, 1990), but that may be too late in the semester to capture motivation and learning strategy scores for those who withdraw as there is a college penalty for withdrawing after the semester midpoint. Thus, the 1/3 point of the semester was chosen to administer the survey.

At the end of the semester, the college data broker collected the survey responses from the learning management system. The data broker added demographic details and student major codes to the data set and created a unique ID for each participant to link data; however, the ID did not link the data to an identifiable participant. Final modified

MSQL reports were sent to the data broker for the alternate identifier to be translated back into the real student identifier. The data broker forwarded the reports to the instructors for distribution to the participating students via college email.

### **Data Analysis**

Data analysis was performed utilizing SPSS version 22. Research questions with dichotomous categorical dependent variables were analyzed with binary logistic regression. Binary logistic regression is commonly employed in educational research where the outcome is binary and there are categorical or continuous independent variables (Cabrera, 1994; Peng, Lee, & Ingersoll, 2002). Research questions with ordered-response, categorical dependent variables were analyzed with ordinal logistic regression, specifically the Polytomous Universal Model (PLUM) which is a proportional odds model (Norusis, 2011). Ordinal logistic regression is commonly employed in social science research where the outcome is a single response or assignment on an ordered scale and the independent variables are categorical or continuous in nature (McCullagh, 1980).

Significance tests for all regressions were conducted with an alpha level of .05. The  $\chi^2$  statistic was used to determine model significance (Cabrera, 1994). Neither binary logistic regression nor ordinal logistic regression utilize a true  $R^2$ ; accordingly, Nagelkerke's  $R^2$  was chosen as a *pseudo- $R^2$*  (Cabrera, 1994; Nagelkerke, 1991). At this point in time, the literature does not specify cut ranges for effect size determination with the use of *pseudo- $R^2$*  tests. Instead, cut ranges for  $R^2$  in linear regression were used for interpretation: .01, .09, and .25 for small, medium, and large effect size respectively

(Cohen, 1988). For categorical variables, the following reference group was used: major course for task value (major course), White for ethnicity, male for gender, and was first generation student for first generation student status. The chi-square of the model coefficients was used to determine model significance. The Delta- $p$  statistic was used to produce predicted probabilities (Cabrera, 1994).



## CHAPTER III

### RESULTS

The resulting number of participants was 86 with usable results varying from 77 to 86 depending on the regression and data supplied by the participants. Peduzzi, et al. (1996) recommends that the dependent variable have at least 10 cases per predictor variable for the less frequent outcome. In the case of each of these regressions, this assumption was not met since the least frequent outcome in both the persistence dependent variable and the achievement dependent variable was five withdrawals (either student did not persist or received a grade of “W”). Results should be interpreted with this caveat in mind. See Table 3 for this sample’s descriptive statistics.

In general, internal consistency of the modified MSQ used in this study were similar to those numbers recorded by Cho and Summers (2012). The internal consistency for self-efficacy in this study was 0.90 compared to 0.77 in the Cho and Summers (2012) study. Internal consistency for other scores gathered but not used in this study were either slightly better or worse than those found in the Cho and Summers (2012) study. See Table 4 for a comparison of internal consistency measures between the two studies.

Table 3

*Descriptive Statistics for Independent Variables in the Sample*

Variable	Frequency	Percentage	<i>M</i> ( <i>SD</i> )	<i>Mdn</i>	Range	
					Minimum	Maximum
Self-efficacy <sup>a</sup>			5.47 (0.94)	5.60	3.40	7.00
Task value (major course)						
Elective	43	50.00				
Major course	43	50.00				
Task value <sup>a</sup> (MSLQ)			5.96 (0.94)	6.22	3.29	7.00
Gender						
Male	22	25.60				
Female	64	74.40				
Ethnicity						
Black	16	18.60				
Other	11	12.80				
White	59	68.60				
First gen status <sup>b</sup>						
Not first gen	35	40.70				
First gen						
Motivation <sup>c</sup>			26.46 (3.22)	26.51	19.18	32.25
Self- management <sup>d</sup>			5.601 (1.04)	5.70	2.70	7.00

Sample size ( $n = 86$ ) except where noted. <sup>a</sup>Self-efficacy and Task value sample size ( $n = 78$ ).

<sup>b</sup>First generation status sample size ( $n = 81$ ). <sup>c</sup>Motivation sample size ( $n = 75$ ). <sup>d</sup>Self-management sample size ( $n = 74$ ).

Table 4

*Internal Consistency Comparison*

	Cho and Summers (2012) Study	Current Study
Interest	0.91	0.79
EGO	0.84	0.48
TV*	0.92	0.89
SE*	0.77	0.90
TA	0.65	0.74
Motivation Total*	0.82	0.84
Course Material	0.90	0.88
Reading	0.88	0.89
Self-management*	0.83	0.88
Interaction	0.82	0.79
Learning Strategies Total	0.91	0.93

Note. \* component used in current study. EGO = external goal orientation, TV = task value, SE = self-efficacy, and TA = test anxiety.

### Research Question One

Table 5 shows the results of the logistic regression analysis of student self-efficacy on online course persistence. Self-efficacy was significant as a predictor  $\chi^2(1, N=78) = 6.58, p < 0.05$  with students scoring higher in self-efficacy being more likely to persist. Nagelkerke's pseudo  $R^2$  of 0.24 corroborated the statistically significant relationship between student self-efficacy and online course persistence. For MSLQ self-efficacy sub-scores of 3.40, 5.46, and 7.00 (i.e., the minimum score, the mean score, and the maximum score of the MSLQ), the predicted probabilities of persistence were 70.5%, 94.2%, and 99.8% respectively. For every unit increase in self-efficacy scores, the odds for students to persist would increase by a factor of 4.60.

Table 5

#### *Binary Logistic Regression of Self-Efficacy as a Predictor for Persistence*

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	Pseudo- $R^2$
Constant	-4.54		6.58*	1	.24
Self-efficacy	1.52	4.60			

\*  $p < 0.05$ .

## Research Question Two

Task value as determined by major or elective course in the program major was not significant as a predictor,  $\chi^2(1, N=86) = 2.04, p > 0.05$ . However, task value as determined by the modified MSLQ task value sub-score was significant as a predictor,  $\chi^2(1, N=78) = 4.16, p < 0.05$ . The predicted probabilities for persistence for students scoring 3.29 (minimum), 5.96 (mean), and 7.0 (maximum) are 65.18%, 96.71% and 98.85% respectively. Table 6 shows the results of both logistic regressions.

Table 6

### *Binary Logistic Regression of Task Value as a Predictor for Persistence*

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	<i>Pseudo-R</i> <sup>2</sup>
Model 1			2.04	1	
Constant	3.74				
Task value (major course)	-1.46	4.31			
Model 2			4.16*	1	0.16
Constant	-2.77				
TV (MSLQ)	1.03	2.81			

*Note.* Major Course (0 = Elective, 1 = Major course) reference category is 1.

\*  $p < 0.05$ .

### Research Question Three

Student self-efficacy and task value as defined by major course were significant as predictors for persistence,  $\chi^2(2, N=78) = 7.27, p < 0.05$ . Nagelkerke's pseudo  $R^2$  of 0.27 suggests a large effect. Table 7, Model 1 shows the result of this regression. Student self-efficacy and task value as operationalized by the modified MSLQ TV score were also significant as predictors for persistence  $\chi^2(2, N=77) = 6.99, p < 0.05$ . Nagelkerke's pseudo  $R^2$  of 0.26 suggests a large effect size. Table 7, Model 2 depicts the results of this regression.

Table 7

#### *Binary Logistic Regression of Self-efficacy and Task Value as Predictors for Persistence*

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	Pseudo- <i>R</i> <sup>2</sup>
Model 1*			7.27	2	0.27
Constant	-3.48				
Self-efficacy	1.43	4.16			
Task Value (Major Course)	-.98	0.38			
Model 2*			6.99	2	0.26
Constant	-5.38				
Self-efficacy	1.16	3.18			
TV (MSLQ)	0.47	1.61			

*Note.* Major Course (0 = Elective, 1 = Major course) reference category is 1.

\*  $p < 0.05$ .

#### Research Question Four

**Gender.** The moderator effect of gender on the relationship between major task value and online course persistence was not significant,  $\chi^2(1, N=86) = 0.00, p > 0.05$ . The moderator effect of gender on the relationship between the modified MSLQ TV score and online course persistence was also non-significant,  $\chi^2(1, N=78) = 0.00, p > 0.05$ . Table 8, Models 1 and 2, show the logistic regression analysis for major course task value moderated by gender and for modified MSLQ TV score moderated by gender respectively.

**Ethnicity.** The moderator effect of ethnicity on the relationship between major course task value and online course persistence was not statistically significant,  $\chi^2(2, N=86) = 1.56, p > 0.05$ . Ethnicity also lacked a significant moderation effect on the relationship between the modified MSLQ TV score and persistence,  $\chi^2(2, N=78) = 4.63, p > 0.05$ . Table 8, models 3 and 4 show the logistic regressions for student major course task value moderated by ethnicity and for the modified MSLQ task value scores moderated by ethnicity respectively.

**First Generation Student Status.** The moderator effect of first generation student status on the relationship between major course task value and online course persistence was not statistically significant,  $\chi^2(1, N=81) = 0.89, p > 0.05$ . Table 8, Model 5 depicts this regression. Student modified MSLQ TV score moderated by first generation student status was also non-significant as a predictor for persistence,  $\chi^2(1, N=78) = 3.53, p > .05$ . Table 8, Model 6 shows the logistic regression for the modified MSLQ task value score moderated by first generation student status.

**Self-regulation.** The moderator effect of self-regulation (as operationalized by self-management) on the relationship between major course task value and online course persistence was supported,  $\chi^2(1, N=74) = 5.34, p < 0.05$ . Nagelkerke's pseudo  $R^2$  of 0.47 suggests a very large effect. Results from this regression can be found in Table 8, Model 7. These results must be interpreted with caution, as the regression coefficient and standard errors for this model were abnormally large, suggesting a multi-collinearity problem (Hosmer & Lemeshow, 2000). Follow-up analysis confirmed a high level of correlation between two pairs of the three terms. Centering the self-management variable did not reduce collinearity.

The moderator effect of self-management on the relationship between the modified MSLQ TV score and persistence was non-significant,  $\chi^2(1, N=74) = 0.81, p > 0.05$ . The results of this regression are found in Table 8, Model 8. As a side note in this sample, self-regulation was significant for main effects on persistence,  $\chi^2(1, N=74) = 4.29, p < 0.05$  with a moderate-sized effect, Nagelkerke's pseudo  $R^2 = 0.20$ .

**Motivation.** Student major task value moderated by motivation was not significant as a predictor for student persistence,  $\chi^2(1, N=75) = 0.03, p > .05$ . Student modified MSLQ TV score moderated by motivation was also non-significant as a predictor,  $\chi^2(1, N=75) = 1.10, p > 0.05$ . These logistic regressions are found in Table 8, Models 9 and 10.



Table 8

*Binary Logistic Regression of Task Value Interactions as Predictors for Persistence*

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	<i>Pseudo-R</i> <sup>2</sup>
Model 1			0.00	1	
Constant	21.20				
Gender	-17.91				
Task Value (Major Course)	0.00				
Gender by Major Course	-1.22				
Model 2			0.00	1	
Constant	21.20				
Gender	-26.61				
TV (MSLQ)	0.00				
Gender by TV	1.44				
Model 3			1.56	2	
Constant	3.37				
Ethnicity = 1	17.84				
Ethnicity = 2	17.84				
Task Value (Major Course)	-0.77				
Ethnicity = 1 by Major Course	-19.52				
Ethnicity = 2 by Major Course	0.77				
Model 4			4.63	2	
Constant	-1.15				
Ethnicity = 1	-908.70				
Ethnicity = 2	22.35				
TV (MSLQ)	0.71				
Ethnicity = 1 by TV	207.96				
Ethnicity = 2 by TV	-0.71				
Model 5			0.89	1	
Constant	21.20				
First Generation Status	-18.16				
Task Value (Major Course)	-18.56				
First Gen Status by Major Course	17.92				

Table 8 Continued

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	<i>Pseudo-R</i> <sup>2</sup>
Model 6			3.53	1	
Constant	-141.19				
First Generation Status	140.07				
TV (MSLQ)	35.30				
First Gen Status by TV	-34.64				
Model 7*			5.34	1	0.466
Constant	-109.60				
Self-management	34.70	1.169E+15			
Task Value (Major Course)	109.44	3.390E+47			
Self-management by Major Course	-34.17	0.000			
Model 8			0.81	1	
Constant	14.10				
Self-management	-3.01				
TV (MSLQ)	-2.96				
Self-management by TV	0.73				
Model 9			0.03	1	
Constant	-1.74				
Motivation	0.21				
Task Value (Major Course)	-2.88				
Motivation by Major Course	0.07				
Model 10			1.10	1	
Constant	28.54				
Motivation	-1.27				
TV (MSLQ)	-5.38				
Motivation by TV	0.26				

*Note.* Major Course (0 = Elective, 1 = Major course) reference category is 1. Gender (0 = Female, 1 = Male) reference category is 1. Ethnicity (1 = Black, 2 = Other, 3 = White) reference category is 3. FirstGenStudent (0 = Not first generation student, 1 = First generation student) reference is 1.

\*  $p < 0.05$ .

### Research Question Five

**Gender.** The moderator effect of gender on the relationship between major task value and achievement was not supported,  $\chi^2(1, N=86) = 1.04, p > 0.05$ . Similarly, the moderator effect of gender on the relationship between modified MSLQ TV score and achievement was not supported,  $\chi^2(1, N=78) = 0.04, p > 0.05$ . The results of these ordinal regressions are shown in Table 9, Models 1 and 2.

**Ethnicity.** Ethnicity did not moderate the relationship between major task value and achievement,  $\chi^2(2, N=86) = 0.42, p > 0.05$ . Neither did ethnicity moderate the relationship between modified MSLQ TV score and achievement,  $\chi^2(2, N=78) = 0.66, p > 0.05$ . The results of these ordinal regressions are shown in Table 9, Models 3 and 4.

**First Generation Student Status.** The moderator effect of first generation student status on the relationship between major task value and achievement was not supported,  $\chi^2(1, N=81) = 0.49, p > 0.05$ . Likewise, the moderator effect of first generation student status on the relationship between modified MSLQ TV score was not supported,  $\chi^2(1, N=78) = 0.44, p > 0.05$ . Table 9, Models 5 and 6, show the results of these ordinal regressions.

**Self-regulation.** Self-regulation (as operationalized by modified MSLQ self-management score) did not appear to moderate the relationship between major course task value and achievement,  $\chi^2(1, N=74) = 0.77, p > 0.05$ . The ordinal regression for major course as task value moderated by self-management is found in Table 9, Model 7. However, the moderator effect of self-management on the relationship between the modified MSLQ TV score and achievement was supported,  $\chi^2(1, N=74) = 9.47, p < 0.05$ .

Nagelkerke's pseudo  $R^2$  of 0.19 suggested a moderate effect size. The ordinal regression for major course as task value moderated by self-management can be found in Table 9, Model 8. The coefficients of both the predictor and the moderator in this model are positive, yet the product term coefficient is negative. This combination of coefficients indicates an antagonistic interaction (Cohen, Cohen, West, & Aiken, 2002); either the effects of high self-management can be dampened by high task value or vice versa.

**Motivation.** Motivation did not appear to moderate the relationship between major course task value and achievement,  $\chi^2(1, N=75) = 0.54, p > 0.05$ . Similarly, a moderator effect for motivation upon the relationship between modified MLSQ TV score and achievement was not supported,  $\chi^2(1, N=75) = 0.28, p > 0.05$ . These ordinal regressions are shown in Table 9, Models 9 and 10.

Table 9

*Ordinal Regression of Task Value Interactions as Predictors for Achievement*

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
<b>Model 1</b>					
Achievement = 0	-3.88	(0.68)		-5.23	-2.54
Achievement = 1	-2.90	(0.59)		-4.06	-1.75
Achievement = 2	-2.40	(0.56)		-3.51	-1.30
Achievement = 3	-1.55	(0.53)		-2.60	-0.51
Achievement = 4	-0.31	(0.51)		-1.30	0.68
Gender	-0.74	(0.61)		-1.94	0.46
Task value (Major Course)	-1.69	(0.85)		-3.35	-0.02
Major Course by Gender	0.99	(0.95)		-0.88	2.86
<b>Model 2</b>					
Achievement = 0	-0.79	(2.30)		-5.29	3.72
Achievement = 1	0.25	(2.27)		-4.19	4.70
Achievement = 2	0.75	(2.26)		-3.68	5.19
Achievement = 3	1.57	(2.26)		-2.87	6.01
Achievement = 4	2.69	(2.28)		-1.77	7.16
Gender	-0.07	(2.81)		-5.57	5.44
TV	0.45	(0.41)		-0.34	1.25
Gender by TV	-0.10	(0.49)		-1.05	0.58
<b>Model 3</b>					
Achievement = 0	-4.16	(0.62)		-5.37	-2.96
Achievement = 1	-3.16	(0.50)		-4.14	-2.19
Achievement = 2	-2.65	(0.46)		-3.55	-1.74
Achievement = 3	-1.68	(0.41)		-2.47	-0.88
Achievement = 4	-0.27	(0.36)		-0.98	0.43
Ethnicity = 1	-1.95	(0.71)		-3.35	-0.56
Ethnicity = 2	-0.87	(0.98)		-2.78	1.05
Task Value (Major Course)	-1.25	(0.50)		-2.22	-0.27
Major Course by Ethnicity = 1	0.21	(1.02)		-1.79	2.21
Major Course by Ethnicity = 2	0.77	(1.23)		-1.65	3.18

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
<b>Model 4</b>					
Achievement = 0	-2.05	(1.58)		-5.14	1.04
Achievement = 1	-0.99	(1.52)		-3.97	1.99
Achievement = 2	-0.46	(1.51)		-3.42	2.49
Achievement = 3	0.51	(1.50)		-2.44	3.45
Achievement = 4	1.77	(1.51)		-1.20	4.74
Ethnicity = 1	-4.61	(4.02)		-12.32	3.27
Ethnicity = 2	-2.53	(5.00)		-12.32	7.27
TV	0.26	(0.25)		-0.23	0.76
TV by Ethnicity = 1	0.47	(0.65)		-0.81	1.74
TV by Ethnicity = 2	0.40	(0.85)		-1.26	2.06
<b>Model 5</b>					
Achievement = 0	-3.65	(0.65)		-4.84	-2.29
Achievement = 1	-2.44	(0.51)		-3.44	-1.44
Achievement = 2	-1.98	(0.48)		-2.92	-1.04
Achievement = 3	-1.13	(0.44)		-2.00	-0.26
Achievement = 4	0.04	(0.42)		-0.79	0.87
FirstGenStudent	-0.24	(0.57)		-1.36	0.89
Major Course	-1.15	(0.63)		-2.38	0.08
FirstGenStudent by Major Course	0.57	(0.82)		-1.03	2.18
<b>Model 6</b>					
Achievement = 0	-0.09	(2.11)		-4.23	4.05
Achievement = 1	0.94	(2.09)		-3.15	5.03
Achievement = 2	1.45	(2.09)		-2.64	5.53
Achievement = 3	2.27	(2.09)		-1.83	6.37
Achievement = 4	3.38	(2.11)		-0.76	7.52
FirstGenStudent	1.77	(2.68)		-3.48	7.02
TV	0.49	(0.35)		-0.20	1.17
TV by Major Course	-0.31	(0.45)		-1.18	0.56
<b>Model 7</b>					
Achievement = 0	0.47	(1.65)		-2.76	3.70
Achievement = 1	1.76	(1.59)		-1.36	4.88
Achievement = 2	2.24	(1.59)		-0.88	5.36
Achievement = 3	3.18	(1.60)		0.04	6.32
Achievement = 4	4.37	(1.64)		1.16	7.59
Self-management	0.76	(0.30)		0.18	1.34
Major Course	1.31	(2.37)		-3.34	5.96
Self-management by Major Course	-0.38	(0.42)		-1.20	0.45

Table 9 Continued

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
<b>Model 8</b>					
Achievement = 0	18.67	(6.90)		5.15	32.19
Achievement = 1	20.07	(6.95)		6.45	33.70
Achievement = 2	20.62	(6.98)		6.95	34.30
Achievement = 3	21.67	(7.02)		7.91	35.43
Achievement = 4	22.91	(7.06)		9.07	36.75
Self-management	4.68	(1.45)	107.34	1.83	7.52
TV	3.20	(1.17)	24.48	0.91	5.49
Self-management by TV	-0.67*	(0.23)	0.51	-1.13	-0.22
<b>Model 9</b>					
Achievement = 0	-3.11	(2.71)		-8.43	2.20
Achievement = 1	-2.07	(2.68)		-7.33	3.18
Achievement = 2	-1.66	(2.68)		-6.90	3.59
Achievement = 3	-0.83	(2.67)		-6.07	4.40
Achievement = 4	0.32	(2.67)		-4.91	5.55
Motivation	0.01	(0.10)		-0.19	0.20
Major Course	-3.46	(3.55)		-10.42	3.51
Motivation by Major Course	0.10	(0.13)		-0.16	0.36
<b>Model 10</b>					
Achievement = 0	6.00	(12.73)		-18.96	30.95
Achievement = 1	7.04	(12.73)		-17.92	31.99
Achievement = 2	7.46	(12.74)		-17.50	32.43
Achievement = 3	8.28	(12.75)		-16.71	33.26
Achievement = 4	9.38	(12.76)		-15.62	34.38
Motivation	0.30	(0.53)		-0.74	1.34
TV	1.37	(2.11)		-2.77	5.51
Motivation by TV	-0.05	(0.09)		-0.21	0.12

*Note.* Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B) reference is letter grade A. Major Course (0 = Elective, 1 = Major course) reference category is 1. Gender (0 = Female, 1 = Male) reference category is 1. Ethnicity (1 = Black, 2 = Other, 3 = White) reference category is 3. FirstGenStudent (0 = Not first generation student, 1 = First generation student) reference is 1.

\*  $p < 0.05$ .

### Research Question Six

Self-regulation as operationalized by the self-management sub-score of the modified MSLQ was significant as a predictor for student achievement in online courses,  $\chi^2(1, N=74) = 5.22, p < 0.05$ . Nagelkerke's pseudo  $R^2$  of 0.07 suggests a small effect size. For each one unit increase in the student's self-regulation score, the odds of getting an A in the course are 1.64 times greater than earning a lower grade. The predicted probabilities for students earning an A with self-management scores of 3.30, 5.40, and 7.00 are 16.31%, 35.57%, and 54.97% respectively. Table 10 shows the results of this ordinal regression.

Table 10

#### *Ordinal Regression of Self-regulation as a Predictor for Achievement*

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
Achievement = 0	-0.52	(1.25)		-2.94	1.92
Achievement = 1	0.75	(1.17)		-1.54	3.04
Achievement = 2	1.22	(1.16)		-1.06	3.50
Achievement = 3	2.14	(1.18)		-0.17	4.45
Achievement = 4	3.27	(1.22)		0.89	5.65
Self-management	0.50*	(0.21)	1.64	0.09	0.91

*Note.* Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B) reference is letter grade A.

\*  $p < 0.05$ .



### **Research Question Seven**

Task value as determined by major course or elective course was significant as a predictor,  $\chi^2(1, N=86) = 5.79, p < 0.05$ . Nagelkerke's pseudo  $R^2$  of 0.07 suggested a small effect size. Students enrolled in major courses (implied greater task value) were 0.39 times more likely to achieve a course grade of A than students taking an elective course (implied lesser task value). The results of this ordinal regression can be found in Table 11, Model 1. Task value as defined by the modified MSLQ task value component was not significant as a predictor for student achievement,  $\chi^2(1, N=78) = 1.68, p > 0.05$ . Table 11, Model 2 shows the results for this regression.

### **Research Question Eight**

Table 12 shows the results of the analysis for Research Question 8. Model 1 containing both self-regulation and major course task value predicted better than chance,  $\chi^2(2, N=74) = 8.66, p < 0.05$ . A grade of A was 0.42 times more likely with courses in a student's major as opposed to elective courses and 1.77 times as likely for each point of increase in MSLQ self-management score. Nagelkerke's pseudo  $R^2$  of 0.12 suggested a moderate effect size. Model 2 containing task value as defined by the MSLQ TV score accompanied by self-management scores was not statistically significant,  $\chi^2(2, N=74) = 5.34, p > 0.05$ .

Table 11

*Ordinal Regression of Task value as a Predictor for Achievement*

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
<b>Model 1</b>					
Achievement = 0	-3.35	(0.53)		-4.39	-2.32
Achievement = 1	-2.37	(0.40)		-3.15	-1.59
Achievement = 2	-1.88	(0.36)		-2.58	-1.17
Achievement = 3	-1.03	(0.32)		-1.65	-0.41
Achievement = 4	0.19	(0.29)		-0.38	0.77
Major Course	-0.95*	(0.40)	0.39	-1.73	-0.17
<b>Model 2</b>					
Achievement = 0	-1.128	(1.37)		-3.81	1.55
Achievement = 1	-0.09	(1.32)		-2.67	2.49
Achievement = 2	0.42	(1.31)		-2.16	2.99
Achievement = 3	1.23	(1.32)		-1.35	3.81
Achievement = 4	2.34	(1.34)		-0.28	4.95
MSLQ TV	0.31	(0.22)		-0.12	0.74

*Note.* Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B) reference is letter grade A. Major Course (0 = Elective, 1 = Major course) reference category is 1.

\*  $p < 0.05$ .

Table 12

*Ordinal Regression of Self-regulation and Task Value as Predictors for Achievement*

Model Parameter	B(S.E.)	Odds Ratio	95% CI	
			Lower	Upper
<b>Model 1</b>				
Achievement = 0	-0.56	(1.25)	-3.00	1.89
Achievement = 1	0.74	(1.17)	-1.56	3.04
Achievement = 2	1.23	(1.17)	-1.07	3.52
Achievement = 3	2.18	(1.19)	-0.15	4.51
Achievement = 4	3.36	(1.22)	0.96	5.76
Self-management	0.57*	(0.22) 1.77	0.15	0.99
Major Course	-0.82	(0.44) 0.44	-1.67	0.04
<b>Model 2</b>				
Achievement = 0	-0.87	(1.54)	-3.89	2.15
Achievement = 1	0.39	(1.48)	-2.50	3.28
Achievement = 2	.086	(1.47)	-2.02	3.75
Achievement = 3	1.77	(1.48)	-1.13	4.67
Achievement = 4	2.91	(1.51)	-0.04	5.86
Self-management	0.54	(0.25)	-0.64	1.03
MSLQ TV	-0.10	(0.28)	-0.64	0.44

*Note.* Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B) reference is letter grade A. Major Course (0 = Elective, 1 = Major course) reference category is 1.

\*  $p < 0.05$ .

### Research Question Nine

Logistic regression analysis of this research question did not produce any significant results. Details are found in Table 13. Motivation moderated by gender was not a significant predictor for student persistence,  $\chi^2(1, N=75) = 0.00, p > 0.05$ . Motivation moderated by ethnicity was not a significant predictor for student persistence,  $\chi^2(1, N=75) = 0.02, p > 0.05$ . Motivation moderated by first generation student status was not a significant predictor for student persistence,  $\chi^2(3, N=75) = 0.04, p > 0.05$ . Motivation moderated by self-regulation (as operationalized by the modified MSLQ self-management sub-score) was not a significant predictor for student persistence,  $\chi^2(1, N=71) = 1.58, p > 0.05$ .

### Research Question Ten

Ordinal regression analysis of this research question did not produce significant results. Details are found in Table 14. Motivation moderated by gender was not a significant predictor for student achievement,  $\chi^2(1, N=75) = 0.64, p > 0.05$ . Motivation moderated by ethnicity was not a significant predictor for student achievement,  $\chi^2(2, N=75) = 3.63, p > 0.05$ . Motivation moderated by first generation student status was not a significant predictor for student achievement,  $\chi^2(1, N=75) = 3.64, p > 0.05$ . Motivation moderated by self-management was not a significant predictor for student achievement,  $\chi^2(1, N=71) = 3.16, p > 0.05$ .

Table 13

*Binary Logistic Regression of Motivation Interactions as Predictors of Persistence*

Model Parameter	<i>B</i>	Exp( <i>B</i> )	$\chi^2$	<i>df</i>	Pseudo- <i>R</i> <sup>2</sup>
Model 1			0.00	1	
Constant	21.20				
Gender	-27.50				
Motivation	0.00				
Gender by Motivation	0.35				
Model 2			0.02	1	
Constant	-6.57				
Ethnicity	0.85				
Motivation	0.37				
Ethnicity by Motivation	-0.03				
Model 3			0.04	1	
Constant	-5.87				
First Gen Status	0.80				
Motivation	0.39				
First Gen Status by Motivation	-0.09				
Model 4			1.58	1	
Constant	46.35				
Self-management	-9.41				
Motivation	-2.01				
Self-management by Motivation	0.43				

*Note.* Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B, 5 = letter grade A) reference is 5. Gender (0 = Female, 1 = Male) reference category is 1. Ethnicity (1 = Black, 2 = Other, 3 = White) reference category is 3.

FirstGenStudent (0 = Not first generation student, 1 = First generation student) reference is 1.

\*  $p < 0.05$ .

Table 14

*Ordinal Regression of Motivation Interactions as Predictors of Achievement*

Model Parameter	B(S.E.)	Odds Ratio	95% CI	
			Lower	Upper
<b>Model 1</b>				
Achievement = 0	-3.48	(3.14)	-9.65	2.68
Achievement = 1	-2.47	(3.12)	-8.58	3.65
Achievement = 2	-2.06	(3.11)	-8.16	4.04
Achievement = 3	-1.27	(3.11)	-7.37	4.82
Achievement = 4	-0.15	(3.10)	-6.24	5.93
Gender	-3.67	(3.78)	-11.07	3.74
Motivation	-0.10	(0.12)	-0.24	0.22
Motivation by Gender	0.12	(0.14)	-0.16	0.40
<b>Model 2</b>				
Achievement = 0	-2.37	(2.15)	-6.58	1.84
Achievement = 1	-1.37	(2.11)	-5.50	2.77
Achievement = 2	-0.93	(2.10)	-5.05	3.19
Achievement = 3	0.01	(2.09)	-4.09	4.11
Achievement = 4	1.30	(2.10)	-2.82	5.41
Ethnicity = 1	-0.93	(4.91)	-10.56	8.70
Ethnicity = 2	-10.12	(6.32)	-22.51	2.27
Motivation	0.04	(0.08)	-0.11	0.20
Motivation by Ethnicity = 1	-0.03	(0.18)	-0.38	0.33
Motivation by Ethnicity = 2	0.40	(0.25)	-0.09	0.90
<b>Model 3</b>				
Achievement = 0	-1.37	(2.57)	-6.41	3.66
Achievement = 1	-0.35	(2.54)	-5.33	4.63
Achievement = 2	0.06	(2.54)	-4.91	5.03
Achievement = 3	0.85	(2.54)	-4.12	5.82
Achievement = 4	1.95	(2.55)	-3.03	6.94
FirstGenStudent	-0.91	(3.49)	-7.75	5.94
Motivation	0.06	(0.10)	-0.13	0.25
Motivation by FirstGenStudent	0.03	(0.13)	-0.23	0.29

Model Parameter	<i>B(S.E.)</i>		Odds Ratio	95% CI	
				Lower	Upper
<b>Model 4</b>					
Achievement = 0	18.44	(10.77)		-2.67	39.55
Achievement = 1	19.78	(10.79)		-1.38	40.93
Achievement = 2	20.18	(10.81)		-1.00	41.36
Achievement = 3	21.17	(10.84)		-0.07	42.41
Achievement = 4	22.36	(10.87)		1.06	43.66
Self-management	4.04	(1.93)		0.25	7.83
Motivation	0.73	(0.43)		-0.10	1.56
Motivation by Self-management	-0.13	(0.07)		-0.28	0.01

Achievement (0 = Withdrawal, 1 = letter grade F, 2 = letter grade D, 3 = letter grade C, 4 = letter grade B) reference is letter grade A. Gender (0 = Female, 1 = Male) reference category is 1.

Ethnicity (1 = Black, 2 = Other, 3 = White) reference category is 3. FirstGenStudent (0 = Not first generation student, 1 = First generation student) reference is 1.

\*  $p < 0.05$ .

## CHAPTER IV

### DISCUSSION AND CONCLUSIONS

In general, the results of this study confirm that much of the existing research on self-efficacy, self-regulation, and task value can be generalized to the online community college student. Furthermore, the results of this study lend support to splitting the theoretical construct of task value into sub-components. The following section addresses persistence results.

#### **Persistence**

In terms of research question one, the results of this present study complement previous research on self-efficacy and persistence (Bandura, 1997; Robbins et al., 2004; Wigfield et al., 1997). Consistent with expectancy-value theory, students who expected to do well in these courses persisted at greater rates than those who did not expect to do well. While the effect size documented in this study (0.24) was somewhat smaller than the 0.34 and 0.36 effects noted in earlier meta-analyses (Multon et al., 1991; Robbins et al., 2004), it was a large effect nonetheless.

Research question two utilized two measures of task value: task value as inferred by major versus non-major course and the modified MSLQ TV score. Consistent with interest theory and expectancy-value theory, students who indicated higher levels of perceived value and interest through their responses comprising the modified MSLQ TV score in these courses persisted at greater rates. Indeed, research on goal theory connecting goals to value suggests that students who are focused on achieving a goal for the purpose of learning new skills or general self-improvement are more likely to persist than those pursuing goals for other reasons (Sideridis & Kaplan, 2011; Wentzel, 2000).



This study's result is also consistent with interest research in terms of stated student interest leading to more engagement (Pintrich, 2003).

Interestingly, the major course task value measure was not significant on persistence as a single predictor. It was originally proposed that this measure could also indicate a student's interest in a course via direct relevance to the major domain. Follow-up analysis showed no significant correlations between the intrinsic goal orientation measure in the modified MSLQ (which might imply interest) and the major course measure of task value. The MSLQ survey did not test for relevance as a single construct.

Drawing from expectancy-value theory, Keller's (1987) conceptual ARCS model divided task value into two components, interest and relevance. Interest was more of a feeling of curiosity and involvement while relevance was more related to utility beliefs. Continuing with teasing apart the differences of task value demonstrated in this study, further exploration showed a significant correlation ( $r = 0.45, p < 0.01$ ) between the modified MSLQ TV score and the modified MSLQ intrinsic goal orientation/control of learning score. Cho and Summers (2012) described this modified MSLQ construct as more of a positive attitude towards the learning material in question. These results suggest one explanation for the differences noted in the two task value measures. The modified MSLQ task value could be measuring more of the interest component of task value, while the major course task value could be measuring more of the relevance component.

For research question three, both measures of task value separately combined with self-efficacy predicted student persistence in asynchronous online courses. In terms of adding the modified MSLQ TV score (inferred interest) to a self-efficacy model of

persistence, the effect size was increased. Since the two predictor variables correlate significantly,  $r = 0.48$ ,  $p < .05$ , and the effect size increased when adding the MSLQ TV score to the model, the modified MSLQ TV score could be acting as a suppressor (enhancer) variable (Conger, 1974). The effect size also increased when adding the major course task value variable to the self-efficacy model; however, those two predictors were not significantly correlated with each other. Nonetheless, the model's effect was increased by the addition. Previous research on self-efficacy has noted a correlation between both the interest and value components of task value and their positive effect on writing performance (Zimmerman, 2008) This current study extends that suggested relationship to various subjects within community college asynchronous online courses.

Research question four tested the interaction effects between task value and student characteristics and their effect on persistence. Both task value measurements were utilized independently. Even though the modified MSLQ TV score was a significant predictor for student persistence, its interactions with other demographic and motivation variables were not predictors for persistence. Likewise, most of the major course task value interactions with demographic and motivation variables were not predictive of persistence. However, one interaction between major course task value and self-regulation as operationalized by the modified MSLQ self-management variable was significant. While the interaction can be questioned due to unresolved multi-collinearity issues, the interaction of these two variables on persistence showed a very large effect size (Nagelkerke's pseudo  $R^2 = 0.47$ ), implying a productive relationship between self-management and major course task value in terms of persistence. Azevedo et al. (2010) suggested such a relationship in their work on self-regulated learning cycles. If major

course task value is thought of in terms of relevancy to a personal goal (i.e. taking a required course in the academic major domain towards the pursuit of a credential and future employment effect), then the use of self-management skills in a major course would have a greater effect on persistence. Indeed, it may be reasonable to assume that it is easier to manage one's time and study environment and regulate effort in a course that is directly related to one's chosen major. Artino and McCoach (2008) also noted a correlation between task value and self-regulation ( $r = 0.62$ ); however, this study's correlation was similar to the Simons, DeWitte, and Len (2004) findings for association between intrinsic motivation, goal orientation, and task orientation.

For research question nine, there were no significant interactions between motivation as a composite construct and student characteristics on persistence. There were no significant interactions noted for gender, ethnicity or first generation student status with either motivation or task value, even though some previous research had found interactions (Allen, 1999; Schiefele et al., 1992)

In summary for persistence, self-efficacy measures in this study had a positive relationship with persistence. Adding either one of the task value measures to the self-efficacy model served to increase the effect on persistence. In other words, adding course interest or course relevance to the belief that one can persevere increases the chance of persistence. Only the proposed interest component of task value was positively correlated with persistence. In this study, the proposed relevance component of task value alone did not affect persistence, only when paired with self-efficacy was persistence positively associated. However, the task value measure of relevance interacted positively with self-regulation/self-management for persistence. This finding suggests that students enrolled

in major courses from their chosen major who also employ high self-management skills tend to persist in greater numbers than those who do not.

### **Achievement**

Five of the research questions addressed student achievement. Research question six asked if self-regulation's effect (more specifically effort, time, and study regulation) on achievement was consistent with Puziffero's (2008) study in online retention where the original MSLQ factors of effort regulation and time and study regulation were found to be significantly correlated with online achievement. The results showed that students who earned higher course grades reported more effort in managing their tasks, time, and study environment.

For research question seven, task value as operationalized by major course (inferred relevance) had a significant relationship with achievement in this sample. This result was inconsistent with some previous research (Artino, 2009) and consistent with others (Means et al., 1997). Task value as operationalized by the modified MSLQ TV score (inferred interest) did not have a significant relationship with achievement, and this result was inconsistent with previous research on interest (Hidi & Harackiewicz, 2000; Schiefele et al., 1992).

Research question eight explored the combination effect of self-management and task value upon achievement. Recall that self-regulation in the form of self-management had a main effect predictive relationship with achievement. That model remained significant only when adding the major course task value score (which also had a main effect predictive relationship with achievement), not when adding the modified MSLQ TV score.

Research question five explored the interactions between student characteristics and task value and their effect on achievement. The only statistically significant finding was for the interaction between self-regulation (as operationalized by self-management) and the modified MSLQ TV score (inferred interest). The results from the regression implied that students who had high values in both the modified MSLQ TV score and the modified MSLQ self-management score may experience a dampening effect on achievement.

In terms of research question ten, none of the models including the modified MSLQ composite motivation score were correlated with achievement. As a reminder, the composite motivation score consists of self-efficacy, intrinsic goal orientation/control of learning, extrinsic goal orientation, task value, and test anxiety sub-scores in the modified MSLQ. The lack of significance lends more evidence that certain motivation components are more important to persistence and achievement than others, and these components should be examined individually.

Tying all these results together, the following summary emerges. Self-efficacy is a primary motivation factor in persistence in asynchronous online community college courses. Self-regulation's behavioral management components are positively associated with achievement. The interest component of task value interacts with self-regulation for achievement, but not for persistence in these courses. The relevance component of task value interacts with self-regulation for persistence, but not achievement. Adding the relevance component of task value to a self-regulation model for achievement amplifies the model's effect. Similarly, adding the interest component of task value to a self-efficacy model of persistence amplifies the model's effect. No interactions were found

for gender, ethnicity, or first generation student status on either persistence or achievement.

### **Implications and Limitations**

The most obvious implication of this study was that community college students taking online asynchronous courses are very similar to other four-year college and university students in terms of findings for self-efficacy and task value. Indeed, results for self-efficacy's effect on achievement has been fairly consistent across multiple populations, including elementary-aged children, high school, and college students (Multon et al., 1991). The current finds suggest that this generalization can be extended to community college online learners. Similarly, validated methods for enhancing and growing self-efficacy of students can be adapted and extended for the online learning environment. For example, appropriate and timely feedback on a task or assignment is an instructional design principle to support self-efficacy (Pintrich, 2003). Oftentimes, students in asynchronous online courses do not experience some of the more immediate feedback available in a classroom environment. Online course instructors and designers need to remember to build immediate and short-term feedback into asynchronous courses in order to promote self-efficacy.

Instructional design considerations can also aid in supporting the task value of a course. While personal interest in course material is a more static construct, studies have shown that situational interest can be manipulated. This interest can lead to higher levels of engagement. One way to increase situational interest is to make the online text more vivid, surprising, or novel so that it grabs the student's attention (Hidi & Harackiewicz, 2000). This technique is particularly useful for the student whose personal interest or

disinterest in the subject has not yet been determined. Another way to increase situational interest is to make sure the course text and content are coherent and easy to comprehend (Schraw & Lehman, 2001). The better organized and easier to follow a text is, the more interesting readers rate the text. Also, there has been some preliminary research that suggests having a visible teaching agent or author increases motivation and shows deeper learning for those students losing interest in a course (Inglese, Mayer, & Rigotti, 2007; Paxton, 2002). Likewise, course design considerations for elucidating the connection between the course material and students' goals can reap benefits (Eccles & Wigfield, 2002; Keller, 1987). Community college students are in a learning curve in study for their chosen trade or profession; relevancy of a particular course or even task may not be readily apparent to them. Articulating a course or task's relevance to the student's future goals and objectives demonstrates the task value early in the endeavor. Also, many students also use community college as a time of low-cost exploration if they are undecided as to a major of study. For students who are undecided, or students who have chosen a major based on unrealistic expectations, better career counseling and advising can help get those students in majors that interest them sooner than later.

Self-regulation in the form of self-management is certainly important in an online environment – particularly when the instructor is not presenting face-to-face with the student. Being able to regulate one's effort at a task is crucial to understanding when and where more or less effort is needed for success. This self-regulation can be supported in online courses by providing frequent “checkpoint” mechanisms for learners to be able to articulate what they do and do not know about the material (Lin & Lehman, 1999; Paris & Paris, 2001). Checkpoints can come in the form of several questions within the text for

the student to complete and then check their own answers; they can be loaded into a learning management system as a very short quiz; or they can be given in the form of a periodic survey asking the students to articulate one thing they understood from this lesson, one thing they did not understand, and one thing that could have been presented differently. In the two latter examples, instructors would also be privy to what the student knows and does not know.

Individual student self-management can also be screened prior to admission to an online course. Students who have knowledge of their self-management patterns and also understand the expectations of self-management for the course will be able to seek help in gaining more skills if necessary. Instructors will also have knowledge of which learners in their course do not currently possess the self-management skills needed for the course; they can refer those students to study skills or academic orientation workshops, etc. Many colleges write their own readiness assessments, but several validated instruments exist including the Learning and Study Strategies Inventory for Learning Online or LASSI instrument (“LASSI for learning online,” 2015) and the SmarterMeasure Learning Readiness Indicator (“Introduction to SmarterMeasure,” 2015).

This study was limited in several ways. First and foremost, the sample size was on the small side of what is recommended for multiple regression analysis. The multicollinearity problems might be resolved by having a larger sample size. In addition, power would increase with a larger sample, so smaller effects may become evident in a larger sample. Another limitation could be found in the type of student who responded. A majority of the students who responded to the survey persisted in the course. It is often



difficult to get those students who were having motivational or academic difficulties to complete a survey. These are the very students we want to study in our sample, and much research on persistence suffers from this dilemma. Perhaps offering this survey earlier in the course would provide a more diverse sample of non-persisting students.

### **Conclusions and Recommendations**

Self-efficacy, self-regulation in the form of self-management, and task value are important motivation constructs for the distance learner. Instructors and developers of online courses need to keep these affective and behavioral components in mind when delivering or creating course content. Often, the focus of both teaching and design is on the subject matter at hand, its pre-requisites for learning, and the tools or environment necessary to convey the instruction. Instructors and designers should not forget personal characteristics of the learners, particularly the students' motivations, expectations, and goals. For the community college student, considerations of the adult learner should also be incorporated.

There is still so much the educational research community does not know about motivation. It is a complex subject with many different theories. More exploration of how these theories of motivation constructs are represented in the online and face-to-face classroom is needed. In particular, a continued examination of task value components seems warranted. College success endeavors will most certainly benefit from a more integrated conceptual and practical understanding of motivation in learning.

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### Part A. Motivation

The following questions ask about your motivation for and attitudes about this class.

**Remember, there are no right or wrong answers, just answer as accurately as possible.** Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

	1	2	3	4	5	6	7
	not at all						very true
	true of me						of me
1.	In a class like this, I prefer course material that really challenges me so I can learn new things.						1 2 3 4 5 6 7
2.	When I take a test I think about how poorly I am doing compared with other students.						1 2 3 4 5 6 7
3.	I think I will be able to use what I learn in this course in other courses.						1 2 3 4 5 6 7
4.	I believe I will receive an excellent grade in this class.						1 2 3 4 5 6 7
5.	I'm certain I can understand the most difficult material presented in the readings for this course.						1 2 3 4 5 6 7
6.	Getting a good grade in this class is the most satisfying thing for me right now.						1 2 3 4 5 6 7
7.	When I take a test I think about items on other parts of the test I can't answer.						1 2 3 4 5 6 7
8.	It is my own fault if I don't learn the material in this						1 2 3 4 5 6 7



- course.
9. It is important for me to learn the course material in this class. 1 2 3 4 5 6 7
  10. The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade. 1 2 3 4 5 6 7
  11. If I can, I want to get better grades in this class than most of the other students. 1 2 3 4 5 6 7
  12. When I take tests I think of the consequences of failing. 1 2 3 4 5 6 7
  13. I'm confident I can understand the most complex material presented by the instructor in this course. 1 2 3 4 5 6 7
  14. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn. 1 2 3 4 5 6 7
  15. I am very interested in the content area of this course. 1 2 3 4 5 6 7
  16. I have an uneasy, upset feeling when I take an exam. 1 2 3 4 5 6 7
  17. I'm confident I can do an excellent job on the assignments and tests in this course. 1 2 3 4 5 6 7
  18. I expect to do well in this class. 1 2 3 4 5 6 7
  19. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible. 1 2 3 4 5 6 7
  20. I think the course material in this class is useful for me to learn. 1 2 3 4 5 6 7
  21. If I don't understand the course material, it is because I didn't try hard enough. 1 2 3 4 5 6 7
  22. I like the subject matter of this course. 1 2 3 4 5 6 7
  23. Understanding the subject matter of this course is very important to me. 1 2 3 4 5 6 7
  24. I feel my heart beating fast when I take an exam. 1 2 3 4 5 6 7
  25. I'm certain I can master the skills being taught in this 1 2 3 4 5 6 7

class.

26. I want to do well in this class because it is important to show my ability to my family, friends, employer, or other. 1 2 3 4 5 6 7
27. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class. 1 2 3 4 5 6 7

### Part B. Learning Strategies

The following questions ask about your learning strategies and study skills for this class. **Again, there are no right or wrong answers. Answer the questions about how you study in this class as accurately as possible.** Use the same scale to answer the remaining questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

- |                          |   |   |   |   |   |                    |
|--------------------------|---|---|---|---|---|--------------------|
| 1                        | 2 | 3 | 4 | 5 | 6 | 7                  |
| not at all<br>true of me |   |   |   |   |   | very true<br>of me |
28. When I study the readings for this course, I outline the material to help me organize my thoughts. 1 2 3 4 5 6 7
29. When checking the course site, I often miss important points because I'm thinking of other things. 1 2 3 4 5 6 7
30. When studying for this course, I often try to explain the material to a classmate or friend. 1 2 3 4 5 6 7
31. When reading for this course, I make up questions to help focus my reading. 1 2 3 4 5 6 7
32. I often feel so lazy or bored when I study for this class that I quit before I finish what I planned to do. 1 2 3 4 5 6 7

- |     |  |   |   |   |   |   |   |   |
|-----|--|---|---|---|---|---|---|---|
| 33. | I often find myself questioning things I hear or read in this course to decide if I find them convincing.                                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 34. | When I study for this class, I practice saying the material to myself over and over.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 35. | When I become confused about something I'm reading for this class, I go back and try to figure it out.                                       | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 36. | When I study for this course, I go through the readings and my class notes and try to find the most important ideas                          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 37. | I make good use of my study time for this course.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 38. | I try to work with other students from this class to complete the course assignments.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 39. | When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 40. | I make simple charts, diagrams, or tables to help me organize course material.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 41. | When studying for this course, I often set aside time to discuss course material with a group of students from the class.                    | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 42. | I treat the course material as a starting point and try to develop my own ideas about it.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 43. | I find it hard to stick to a study schedule.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 44. | When I study for this class, I pull together information from different sources, such as lectures, readings, and discussions.                | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 45. | Before I study new course material thoroughly, I often skim it to see how it is organized.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 46. | I ask myself questions to make sure I understand the material I have been studying in this class.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 47. | When course work is difficult, I either give up or only  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

study the easy parts.

- |     |   |   |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|---|---|
| 48. | I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying for this course. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 49. | I try to relate ideas in this subject to those in other courses whenever possible.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 50. | When I study for this course, I go over my class notes and make an outline of important concepts.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 51. | When reading for this class, I try to relate the material to what I already know.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 52. | I try to play around with ideas of my own related to what I am learning in this course.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 53. | When I study for this course, I write brief summaries of the main ideas from the readings and my class notes.                                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 54. | When I can't understand the material in this course, I ask another student in this class for help.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 55. | I try to understand the material in this class by making connections between the readings and the concepts from the lectures.                 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 56. | I make sure that I keep up with the weekly readings and assignments for this course.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 57. | Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 58. | I make lists of important items for this course and memorize the lists.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 59. | I check this class site regularly.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 60. | Even when course materials are dull and uninteresting, I manage to keep working until I finish.   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 61. | I try to identify students in this class whom I can ask for help if necessary.  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- |     |   |   |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|---|---|
| 62. | When studying for this course I try to determine which concepts I don't understand well.            | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 63. | I often find that I don't spend very much time on this course because of other activities.          | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 64. | I rarely find time to review my notes or readings before an exam.                                   | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 65. | I try to apply ideas from course readings in other class activities such as lecture and discussion. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

*\* Adapted from the Motivated Strategies for Learning Questionnaire (Cho & Summers, 2012; Pintrich, Smith, & McKeachie, 1991)*

## APPENDIX B

### Feedback Report Template for Modified MSLQ

#### Modified Motivated Strategies for Learning Questionnaire (MSLQ)<sup>1</sup>

Earlier this academic year, you took a modification of the questionnaire called the Motivated Strategies for Learning Questionnaire (also called the MSLQ). The purpose of this questionnaire was to gather some information about your study habits, your learning skills, and your motivation for schoolwork. As promised, we are providing you with feedback from the modified MSLQ on your study habits, learning skills, and motivation. This handout describes how to interpret your scores, so you can figure out what the scores mean.

This feedback is intended to help you determine your own strengths and weaknesses as a student. From past experience, we have found that students like to have some information on how other students do on the MSLQ. Therefore, we have included information about the average levels of motivation and learning skills for the students in the courses that participated in this survey. This sample of students as a whole may be generally high in some areas and low in others, so think about your own skills rather than about comparisons with others.

You may want to use this feedback to do something about changing your study skills or motivation. All of the motivational and study skills mentioned on your feedback sheet are learnable. This is an important idea to remember, especially in college. You can decide whether you want to change these aspects of your learning style. We have provided some hints to go along with each scale. We hope you find these suggestions helpful. But keep in mind that these are not the only ways to improve each area. You may want to seek additional help from services available at your institution.

How to interpret your scores. All the scales are based on a seven point scale. Although some items were worded negatively, we have reversed these questions so that in general, a higher score such as a 4, 5, 6, or 7 is better than a lower score like a 1, 2, or 3. The only exception is the test anxiety scale, where a high score means more worrying.

The average score for this sample of students, as well as the breakdown of the scores for the bottom 25%, middle 50%, and the top 25%, is provided for each scale. If your score

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<sup>1</sup> Adapted from the *Motivated Strategies for Learning Questionnaire Manual* (Pintrich, Smith, & McKeachie, 1991)

is at the bottom 25% on the scale, this means that most of the students in your class are reporting more motivation or use of learning strategies than you. If your score is in the middle 50%, then you are similar to most students. If your score is in the top 25%, then you think you are more motivated or use more learning strategies than other students. In general, if your scores are above 3, then you are doing well. If you are below 3 on more than six of the nine scales, you may want to seek help from your instructor or the counseling services at your institution.

Motivation Scales: The first three scales refer to your motivation for the course, confidence in doing well in school, and your anxiety about taking tests.

### **I. Motivation: Interest**

This is a measure of how interested you are in the material being covered in this course. A high score means you like the subject matter and very interested in the content area of this class.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

**Suggestions:** Skim the table of contents of the course textbook or take a look at the course syllabus and make a list of the three topics that most interest you of the three topics that least interest you. Pay particular attention to these topics. What is it about the three topics that makes you like them so much? What is it about the other three topics that makes them uninteresting? Can you find any of the characteristics of the three most interesting topics in the three least interesting topics? If you identify what it is about the three most interesting topics that makes you like them so much, you may be able to apply what you found to the three least interesting ones, and perhaps you'll find that those uninteresting topics aren't so uninteresting after all!



## II. Motivation: Expectancy for Success

This is a measure of your perceptions of your potential success in this course and of your self-confidence for understanding the course content. A high score means that you think you will do well in the course, and feel confident that you will be able to master the course material.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

Suggestions: Evaluate your current approach to a course assignment from different points of view. For example, describe the effectiveness and ineffectiveness of your own approach from your own perspective. Then imagine how a classmate might evaluate your approach. By analyzing the way you are tackling an assignment, you may be able to figure out what you're doing right and what you're doing wrong and can change your approach. A better understanding of the way you learn, what works and what doesn't work, may help increase your confidence in doing well in this course.

### III. Text Anxiety

This is a measure of how much you worry about tests and how often you have distracting thoughts when you take an exam. In contrast to the other scales, a high score here means that you are anxious in testing situations.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

**Suggestions:** Developing better study skills usually results in less anxiety. Prepare well for class and try to complete assignments on time. Try not to wait until the last minute to get things done or to get ready for an exam. Doing this should help build your confidence at test time and hopefully reduce test anxiety. When taking a test, concentrate on one item at a time and if you're stumped on a question, move on and go back to the question later. Remind yourself that you've prepared well and if you can't answer some questions, it's ok; you'll still be able to answer the others.

Cognitive Scales: The remaining four scales refer to different kinds of study skills and learning strategies you reported using for this course.

#### **IV. Learning Strategies for Course Material**

This scale is a measure of how often you use study strategies such as rereading class notes and course readings and memorizing lists of key words and concepts. It also refers to your ability to select the main ideas from your readings as well as your attempts to organize and put together what you need to learn in this course. A high score means you use these strategies fairly often.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

Suggestions: List the important terms and topics in the course. Define them and repeat them out loud. Break up that list into smaller lists that are made up of closely related items. Make up images or rhymes to help you remember those lists. Generate test items to help you measure your recall. Outline course material and identify where the text and lecture overlap and don't overlap. This will give you a starting point in developing connections between ideas presented in two different contexts. Make charts, diagrams, or table of the important concepts. Something like a flowchart or a tree diagram is usually very helpful in trying to understand how different ideas "go together".

### V. Learning Strategies for Reading

This is a measure of how often you think about what you are reading or studying as you do your schoolwork. For example, do you monitor your attention while you read or do you often find that you have read 10 pages in your textbook and can't remember anything about it? Do you adjust your reading speed if you are reading something difficult in comparison to reading the newspaper? This scale also reflects how often you attempt to summarize or paraphrase (put into your own words) the material you read in your textbooks, and how often you try to relate the material to what you already know or have learned. A high score means that you use these strategies fairly often and check on whether you understand what you have read.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

Suggestions: Skim the reading material before you begin to see how it is organized. Look at the headings and subheadings of the text to give yourself an idea of how things are related to each other. While reading, ask yourself questions about the paragraph you have just read and scribble key words in the margins of the book or in a notebook. Try to determine which concepts you don't understand well. Although this method takes longer initially, you are more likely to remember what you have read. This saves you time later when studying for a test. Paraphrase and summarize important information. Use your own words to describe the material covered during lecture or in assigned readings. Pretend you're the teacher and are trying to explain the topic to students! Try to figure out how each topic relates to each other. What are the connections between what you've heard in lecture, talked about in discussion, and read in the book?

## VI. Self-Management

This scale is a measure of how well you manage your time and schedule, and your use of a place to study. It also refers to your willingness to try hard on your schoolwork, even when the work is difficult. A high score means that you try hard and exert effort in your studying. It also means you probably try to study somewhere where you can finish your schoolwork.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

Suggestions: Keep track of what you do with your study time for a week. Write down your goals for each study period and then write down what you actually accomplished during that study period. Analyze the chart at the end of the week. You may want to change the place where you study, or the times when you study, or who you study with. Try to come up with a study schedule that works best for you.

## VII. Interaction

This scale measures your collaboration with peers in the course and how frequently you seek the support of others, including instructors and student support staff. A high score means you interact frequently with others in this course.

Your score: \_\_\_\_\_

Sample mean: \_\_\_\_\_

Bottom 25%: \_\_\_\_\_

Middle 50%: \_\_\_\_\_

Top 25%: \_\_\_\_\_

**Suggestions:** Talk with your classmates when you need help clarifying course material. You may reach new or different insights through this conversation. Seek help from your peers, instructor, or tutoring center to help you understand a concept that you just learned.

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- Mandell Award, Old Dominion University, 2014

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- 2010-2013. Co-PI. Boehme, J., Newman, D., and Desmarais, R. Department of Commerce Broadband Recovery Grant, \$976,537.