USING MASTERY EXPERIENCES IN UNDERGRADUATE AGRICULTURE COURSES TO INFLUENCE STUDENT SELF-EFFICACY

A Dissertation

by

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Submitted to the Office of Graduate and Professional Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

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May 2020

Major Subject: Agricultural Leadership, Education, and Communications

ABSTRACT

The numbers of students completing certificates and degrees have improved over the years, but current rates of attainment are not enough to meet state government established goals. New initiatives in higher education, especially those at the community college level, are aimed at helping students develop a growth-oriented mindset toward learning. Self-efficacy for learning is a necessary condition for this type of mindset. Previous research showed that the college classroom could be used to influence student self-efficacy.

Students enrolled in two introductory agricultural science courses at a community college in Texas participated in a quasi-experimental, pre-test post-test design study to evaluate the effectiveness of mastery experiences on student self-efficacy for learning during the Fall 2019 semester, N = 100. Participants enrolled in the treatment groups of the two courses were exposed to three supplemental, mastery experiences during weeks three through 14 of the semester. Those in the control groups received only the standard curriculum. Data relating to student gender, past educational experiences, feelings towards attending college, and outside of class responsibilities were also collected.

Results of the study showed that self-efficacy for learning mean scores declined for all groups from pre-test to post-test. Mean scores for most all other motivation and learning behaviors also declined from pre-test to post-test. Correlations revealed statistically significant relationships for self-efficacy for learning post-test mean scores and expected course grade for participants in both courses. When analyzed separately, analysis of variance found no statistically significant difference between self-efficacy for learning mean scores between treatment and control groups for both courses. When analyzed together, analysis of variance

found no statistically significant difference between self-efficacy for learning mean scores between participants who were exposed to the exercises and those who were not.

Characteristics of the study participants as well as the timing of the post-test administration were believed to have had an effect on study results. The researcher recommends continuing the current study for the next two semesters in order to have more data to analyze and developing new studies using the current study as a starting point.

DEDICATION

This dissertation is dedicated to my family, but most especially my husband, Vicente. This journey would have never been possible without all their support and sacrifice.

ACKNOWLEDGEMENTS

I would first like to thank God for giving me the strength and resources to complete this program. He is the solid rock on which I stand. To my husband, thank you for putting your life on hold while I fulfilled this dream. I know going into this, you had no idea everything this project would entail, but you never complained and constantly supported me. Chente, te amo. To Rachel and Justin, thanks for believing in me and boosting my ego when I felt so inadequate. I love you both more than you could ever imagine. Mom and Dad, when children are raised in homes where they are loved and encouraged, taught to respect others and themselves, and are shown strong work ethics, they become adults who are prepared to face the world. Thank you both for building in me the skills I needed to make it in life. Any successes I have are the result of the foundation you both created. To my sister Cheryl, thank you for supporting and believing in me throughout all our lives.

Special appreciation goes to my committee chair, Dr. Theresa Murphrey. Thank you for being my champion throughout the program, believing in me and my abilities, and guiding me. I hope one day I can be as good of a mentor to someone else as you have been to me. Thank you to my committee members, Dr. Julie Harlin, Dr. Barry Boyd, and Dr. Joyce Juntune. This experience has been amazing and I know a large part of that was due to the team of people who worked with me. I appreciate all your guidance and support through every stage.

CONTRIBUTORS AND FUNDING SOURCES

Contributors

This work was supervised by dissertation committee chair Associate Professor Theresa Pesl Murphrey in the Department of Agricultural Leadership, Education, and Communications. All work conducted for the dissertation was completed by the student independently.

Funding Sources

This work received no university or outside funding.

NOMENCLATURE

60x30	Texas Higher Education Coordinating Board Strategic Plan *60x30*
ANSC	Introduction to Animal Science Course
CCCSE	Center for Community College Student Engagement
CLB	Control of Learning Beliefs
CT	Critical Thinking
CTG	Texas Higher Education Coordinating Board Strategic Plan *Closing the Gaps*
EGO	Extrinsic Goal Orientation
HORT	Horticulture Course
IGO	Intrinsic Goal Orientation
MET	Meta-cognitive Self-Regulation
SEF	Self-Efficacy for Learning and Performance
THECB	Texas Higher Education Coordinating Board

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CHAPTER I

INTRODUCTION

Increasing student participation and success in higher education has been a priority in Texas for two decades. State leaders believed that, if current trends continued, Texas workers would fail to keep up with the skills and abilities needed to be competitive in a global workplace. Their concerns provided the basis for the past two higher education strategic plans. In October of 2000, the Texas Higher Education Coordinating Board (THECB) adopted their first plan, *Closing the Gaps* (CTG).

> Texas is profiting from a diverse, vibrant, and growing economy. Yet this prosperity could turn to crisis if steps are not taken quickly to ensure an educated population and workforce for the future. At present, the proportion of Texans enrolled in higher education is declining. Too few higher education programs are noted for excellence and too few higher education research efforts have reached their full potential. Texas must take bold steps for the future success of its people. (THECB, 2000, p. 1)

CTG laid out a road map for improving higher education participation, success, excellence and research by Fall 2015 (THECB, 2000). Its strategy for meeting participation and success goals targeted multiple groups. To encourage underrepresented groups to access higher education, THECB launched statewide awareness campaigns aimed at parents that outlined the benefits of higher education and explained the process for accessing the system (THECB, 2000). The State also provided greater access to grants and scholarships for students with financial need (THECB, 2000). THECB encouraged the retention and development of quality teachers and encouraged the hiring of greater numbers of teachers at elementary and secondary levels to better

prepare students (THECB, 2000). Colleges and universities were directed to improve student retention and program completion by proposing that their institutional funding be linked to those metrics (THECB, 2000). By Fall 2015, CTG reported successes. The enrollment at public, independent, and career institutions in Texas reached 96% of the targeted rate of 630,000 more students enrolled in higher education. Hispanic student enrollment increased every year and there were also improvements in African-American and Hispanic student degree completion (THECB, 2016). These gains were movement in the right direction, but the pattern was not the steady, sustained, year-to-year improvements THECB had hoped. When looking at the results from year to year, the final report showed periods of progress followed by periods of decline then course corrections to get back on track (THECB, 2016).

Following CTG, THECB adopted a second plan of educational goals for 2015 to 2030. In 2015, THECB adopted *60x30*. The overreaching goal of this current plan is to have at least 60% of Texans aged 25 to 34 as certificate or degree holders by 2030 (THECB, 2015). In their 2019 interim report, THECB reported that progress was being made. The percentage of 25-to 34-year olds in Texas with a postsecondary credential had grown from 40.3% in 2014 to 43.5% in 2017 (THECB, 2019). While these improvements were welcomed, the results were concerning when compared to plan benchmarks. To reach the 60% goal by 2030, a rate of 48% of the target population needed to possess a postsecondary credential by 2020 (THECB, 2019). The largest percentage recorded since the plan's inception was 43.5% in 2017 (THECB, 2019). Based on the past rates and the projected rate for 2020, the state was not in line to reach the 2030 goal. Another area of concern was the participation by underrepresented groups. THECB (2019) reported that completions for African American and Hispanic students slowed. THECB data also revealed that participation by males in all ethnic groups declined.

For many students, a popular avenue to enter higher education is through a community college. Community colleges, once called junior colleges, began in 1901, but did not become widespread across the country or popular until after World War II with the passage of the G. I. Bill of Rights (Mellow, 2000). Mellow (2000) stated that community colleges are the "Ellis Islands" of American higher education because they bring in individuals from all corners of the globe, the students from historically underrepresented domestic populations, and those older adults seeking new skills in order to improve the lives of their families. Public community colleges typically provide the first two years of academic coursework as well as career and technical training. This training is usually provided at a lower cost than private institutions and universities (Kolsenikova, 2009). Another important characteristic of the community college is the open admission policies. Open admissions policies allow for college acceptance regardless of prior academic record. While students are guaranteed acceptance to community colleges, their ability to enroll in certain courses is limited by their college assessment scores.

THECB directives to increase participation, success, and completion of post-secondary certificates and degrees are aimed at all public education providers, including community colleges. Because of their open admission policies and history of teaching a greater concentration of underrepresented populations, community colleges have struggled in the areas of student retention and completion. The Center for Community College Student Engagement (CCCSE, 2016) reported that two-thirds of community college students enter institutions every year underprepared and not ready for college-level work. Being underprepared for the rigors of college-level work leads to lower retention and completion rates. Institutions have attempted to address these issues with better academic counseling, increased access to pre-placement test preparation, wider varieties of student support services, more comprehensive student orientation

courses, and changes to developmental education or remediation programs (CCCSE, 2016, 2019). These programs have not produced the success that all had hoped (CCCSE, 2019). Community colleges are now embracing an additional approach by attempting to influence students' beliefs about themselves and education; their mindset. The hope is by changing a student's mindset, student engagement, persistence, and success will improve (CCCSE, 2019).

Problem

Previous college initiatives such as better academic advising, revision of developmental education sequences, increased student support services, and pre-placement training have not generated the level of desired results toward higher education goals (CCCSE, 2019). Research by CCCSE (2019) indicated that mindset plays an important role in student engagement and success. Previous research demonstrated that mindset influenced student persistence. Current higher education initiatives focus on helping students develop a growth-oriented mindset. The necessary ingredient needed for this type of outlook is self-efficacy (Dweck, 2016).

The purpose of this study was to determine the effectiveness of using enactive mastery experiences in the classroom to increase college student self-efficacy for learning. Additional areas of interest in the study were to investigate the relationship between self-efficacy for learning and intrinsic motivation, extrinsic motivation, critical thinking, control of learning behaviors, and meta-cognitive self-regulation. The objectives of the study were:

1. Determine the effectiveness of enactive mastery experiences on self-efficacy of community college students enrolled in undergraduate agriculture courses,
2. Compare the impact of enactive mastery experience on self-efficacy in different agriculture courses, and

3. Investigate the relationships between classroom experiences and student characteristics with beliefs about self-efficacy, types of goal orientation, control of learning, critical thinking, and metacognition.

The null hypothesis for this study was that no significant difference would exist between the self-efficacy beliefs for learning of students who participated in supplemental enactive mastery classroom experiences, the treatment, and those who received the standard course curriculum.

Significance of the Study

Even though colleges and universities have implemented many services and programs to improve student engagement and success, participation and completion rates have not met state identified benchmarks. To reach the current goal of 60% of Texans with certificate or degree by 2030, the number of completions needed to grow at a rate of 3.9% per year (THECB, 2019). For the year 2018, the rate of growth in completions slowed to 2.2% (THECB, 2019). The 2018 slowdown was greatest in the number of students earning certificates and associate degrees (THECB, 2019). To make up for two of the three past years being below the required rate, the rate of growth for the next two years would need to be approximately 5% per year (THECB, 2019). The largest growth rate experienced since the plan's beginning in 2015 was 3.9% in 2017 (THECB, 2019).

Due to the composition of their student populations, community colleges in particular have a challenging task. According to CCCSE (2016), many community college students did not have successful K–12 experiences and those experiences have influenced their perception of higher education. This has caused some to lay out of school for years. Another problematic area for community colleges was lack of student preparedness. Results from surveys (CCCSE, 2016)

revealed that some students are unaware of their lack of preparation for the rigors and demands of college-level work. In a 2016 survey, 86% of first time, first-year college students reported that they believed they were academically prepared for college. However, of that same group, 68% required at least some developmental education upon entering (CCCSE, 2016). "Student responses reveal a disconnect between their perceptions of college readiness and their actual preparedness" (CCCSE, 2016, p. 8). Being underprepared for college work can lead to delayed degree completion or complete higher education drop out. Data from the National Student Clearinghouse (Shapiro et al., 2014) showed that of the Fall 2008 cohort of first-time in college degree seeking students, only 39% had earned a degree or certificate within six years. Of those who had not earned a degree or certificate within six years, 43% were no longer enrolled in college coursework (Shapiro et al., 2014). If classroom mastery exercises proved effective to build self-efficacy for learning, including them as part of the standard curriculum in undergraduate courses could lead to overall improvements in program completion rates.

Definition of Terms

For the purpose of the study, the following terms are defined operationally as follows:

Enactive Mastery Experiences – Ungraded classroom activities where the individual or a collection of individuals, under their own actions, work to solve an instructor specified problem without the help of resource materials or direct instructor support.

Self-efficacy for Learning and Performance - Judgments of one's ability to accomplish a task and confidence in one's skills to perform a task.

Intrinsic Goal Orientation – Focus of goals in the course are learning and mastery of course content.

Extrinsic Goal Orientation – Focus of goals in the course are grades and approval of others.

Critical Thinking – The use of strategies to apply previous knowledge to new situations or make critical evaluations of ideas.

Meta-cognitive Self-Regulation - The use of strategies that help students control and regulate their own cognition.

Control of Learning Beliefs – The students' beliefs that outcomes are contingent on one's own effort rather than external factors such as the teacher or luck.

Assumptions

The primary assumption of the study was that the sample of participants in the study were representative of college students enrolled in similar courses. It was also assumed that the instructors of the courses did not inject bias into the study, expose members of the control groups to the treatments, implemented the supplemental exercises as designed, and the information reported in terms of duration and frequency of the exercises were accurate.

CHAPTER II

REVIEW OF LITERATURE

According to Fraenkel et al. (2012), a literature review is an assessment of a body of literature that relates to a specific question. It provides the researcher with the results of previous studies as well as being a source for ideas for future studies. This review of literature was developed to provide a theoretical basis for this study by discussing more fully the concept of mindset, the methods used to build self-efficacy, and the effectiveness of the college classroom to influence self-efficacy for learning.

Mindset

Why is someone's view of their abilities so important? According to Dweck and Leggett (1998), the amount of effort an individual is willing to expend in pursuit of any goal was impacted by one's view of themselves and their abilities. The authors explained that many of life's valued pursuits such as career, relationships, and moral strivings, require persistent, long-term effort. Dweck and Leggett (1998) identified two general types of cognitive-affect behavior: the adaptive mastery-oriented response and the maladaptive helpless response. A mastery-oriented pattern involved seeking challenging tasks and continuing to strive towards goals even under failure. The maladaptive helpless behavior was characterized by avoiding challenge and a deterioration of performance in the face of obstacles. When faced with failure, those in their studies with the helpless pattern of behavior were the first to report negative self- cognitions (Dweck & Leggett, 1998). These participants attributed their failures to personal inadequacy, citing deficient intelligence, memory, or problem-solving ability as the reasons for their failure. Those same individuals showed aversion to the task at hand, expressed that they were bored, and exhibited anxiety over their performance. Over time, those individuals with the helpless patterns

engaged in task irrelevant behavior and seemed to attempt to bolster their image in other ways, such as speaking of talents in other domains (Dweck & Leggett, 1998). As more and more tasks were assigned, the helpless pattern individuals showed a decline in ability. In contrast, mastery-oriented individuals viewed failures as challenges to overcome. Dweck and Leggett (1998) noted that the mastery-oriented individuals in their studies engaged in extensive solution-oriented self-instruction and self-monitoring. Those individuals instructed themselves to exert effort or to concentrate and they monitored their level of effort and attention. The mastery-oriented individuals appeared to maintain a sense of optimism. Dweck (2015) later described this mastery-oriented pattern as being a growth-oriented mindset that believed that things could change and difficult tasks could be accomplished with effort and attention. The helpless pattern discussed in the earlier studies (Dweck & Leggett, 1998) influenced the later description of a fixed mindset by Dweck (2015). The fixed mindset believed that abilities and situations cannot change and, because of this fixed nature, efforts to try to influence them were futile. Dweck (2016) stated a person's beliefs about themselves and their situations frame their thinking about learning. According to Dweck (2015), students with a growth-oriented mindset have a greater likelihood of success in and out of school and the key to a growth mindset is self-efficacy.

Self-Efficacy and Enactive Mastery Experiences

Social Cognitive Theory (Bandura, 1982, 1993, 1997, 2001) stated that sensory, motor, and cerebral systems are tools that people use to give meaning, direction, and satisfaction to their lives. Simple exposure to stimulation is not enough for individuals. For events to be meaningful, an individual must take agentic action in exploring, manipulating, and influencing their environment (Bandura, 2001). To be an agent, a person must intentionally make things happen by their own action. Our intentional outcomes are consequences of these agentic acts. These acts,

Bandura (2001) stated, are dictated by a plan of action. An individual's plan of action needs forethought, self-reactiveness, and self-reflection. Forethought requires setting goals and selecting a course of action to help achieve those goals (Bandura, 2001). Self-reactiveness serves a motivator and a self-regulator of behavior. Self-reflection, sometimes called meta-cognition, helps the individual evaluate their motivation, values, and the meaning of their life pursuits (Bandura, 2001). Human agency requires the belief of the individual that they have capacity to exercise some control over their own functioning and over environmental events (Bandura, 1977). This belief is self-efficacy.

Self-efficacy is not the same as self-esteem. Self-efficacy involves a judgement of capacity while self-esteem is a judgement of self-worth (Dinther et al., 2011). Linnenbrink and Pintrich (2003) stated that self-efficacy is not global in nature but rather situational. It serves as a judgement about ability related to a specific task. Self-efficacy exerts influence over many aspects of life. Perceived self-efficacy helps to account for such diverse phenomena as changes in coping behavior, level of physiological stress reactions, "self-regulation of refractory behavior, resignation and despondency to failure experiences, self-debilitating effects of proxy control and illusory inefficaciousness, achievement strivings, growth of intrinsic interest, and career pursuits" (Bandura, 1982, p. 122). Higher levels of self-efficacy encourage participation, persistence, and effort that lead to improved performance. "Those who believe they can successfully accomplish a goal tend to be more motivated to behave in ways that contribute to goal accomplishment" (Jansen, 2012, p. 259).

Bandura (1997) stated that self-efficacy can be developed by enactive mastery experiences, social modeling (vicarious experiences), social persuasion (verbal persuasion), and physical and emotional states. While all of these methods build self-efficacy, some are more

effective than others. The strongest builder of self-efficacy are enactive mastery experiences (Bandura, 1997, 2001; Dinther et al., 2011; Jansen, 2012). Enactive mastery experiences are defined as non-simulated, singular events in which an individual or collective directly experiences a sense of success in performing an action that is believed to contribute to the attainment of an overarching immediate or long-term goal (Jansen, 2012). The necessary condition for enactive mastery experiences is that the individual is behaving at the moment on their own and demonstrating to themselves that they are able to perform the task (Jansen, 2012). Linnenbrink and Pintrich (2003) stated that enactive mastery experiences allow the individual to make a judgement regarding their own competence and ability related to the task. In various studies, Bandura found that people register notable increases in self-efficacy when their successful experiences disconfirm misbeliefs about what they feared and when they gained new skills to manage threatening activities (Bandura, 1982, 2001). All enactive experiences have value, even unsuccessful ones. Bandura (1993) stated that failures provided necessary information for refinement.

Successful completion of any task does not directly translate into improved self-efficacy. For an enactive experience to be truly valuable, the task must be sufficiently challenging and the feedback received must be accurate (Linnenbrink & Pintrich, 2003). Tasks should require effort. Linnenbrink and Pintrich (2002) stated that easy tasks can be used in education for practice to build automaticity of skill, but to build self-efficacy the individual needed to be challenged. The researchers found that challenge increased motivation and helped the individual to gain new skills. Equally critical to the task challenge level was the feedback the individual received during and after the experience. Linnenbrink and Pintrich (2003) cautioned that empty feedback such as “nice work” or “good job” do very little to help the individual judge their performance or

communicate information about their skill level. Generic feedback does not identify areas of competency or provide the individual with information on the specific areas that need refinement. Feedback full of undeserved praise that implies the work met the required standards when in reality it did not, was also dangerous (Linnenbrink & Pintrich, 2003). The false feedback on performance created the false sense mastery that would be detrimental in future experiences.

Influence of Self-Efficacy on Student Behaviors

With regards to academics, Ziegler and Opdenakker (2018) found a negative relationship between academic procrastination and self-efficacy; as student self-efficacy increased, academic procrastination declined. Harris et al. (2017) found that students with higher academic self-efficacy had higher levels of academic performance. In their study of first-generation college students, Sanchez and Nichols (2007) found that students with higher academic self-efficacy made a better adjustment to the college environment. Chemers et al. (2001) also found that students with higher levels of academic self-efficacy had higher levels of academic performance. These researchers discovered that self-efficacy influenced student expectations, coping perceptions on course performance, stress, health, and overall satisfaction and commitment to stay in school. "The contribution of self-efficacy to educational achievement is based both on the increased use of specific cognitive activities and strategies and on the positive impact of efficacy beliefs on the broader, more general classes of metacognitive skills and coping abilities" (Chemers et al., 2001, p. 55). Linnenbrink and Pintrich (2003) found that students with high self-efficacy beliefs showed an increase in the use of deeper processing strategies such as elaboration and organizational strategies as well as metacognitive strategies over time. Their study found students who were confident in their skills were much more likely to try to understand their coursework and think more deeply about it. The higher self-efficacy participants in their study

were also more likely to plan, monitor, and regulate themselves while working on their tasks. Lower levels of self-efficacy caused decreased effort, increased the likelihood of giving-up, and increased feelings of self-doubt (Linnenbrink & Pintrich, 2003). Dinther et al. (2011) found in their study that low self-efficacy in academic work was a breeding ground for student depression, tension, and helplessness.

Educational Settings and Self-Efficacy

Various studies have been done to analyze the link between coursework and student self-efficacy (Atheron, 2017; Bautista, 2011; Cassidy & Eachus, 2002; Covington & Mueller, 2001; De Castella et al., 2013; Denley & Knox, 2016; Graham & Weiner, 2012; Huang, 2016; Kremer et al., 2019; Krumrei-Mancuso et al., 2013; Linnenbrink & Pintrich, 2002; McKeachie et al., 1986; Niemiec & Ryan, 2009; Orange & Ramalho, 2013; Papinczak et al., 2008; Pilling & Nasser, 2015; Pintrich, 2003, 2004; Ryan & Deci, 2000; Schunk, 2005; Sheu et al., 2018; Soyer & Kirikkanat, 2018; Wagener, 2013; Zeldin et al., 2008). Dinther et al. (2011) conducted a narrative review of studies related to self-efficacy and its effects on the learning process. In their review of literature, they found studies that reported self-efficacy as influencing motivation and cognition by affecting a participant's task interest, task persistence, goal setting, and decision-making. Their results showed it was possible for educational programs to influence the student's perception of self-efficacy. They found that the programs that had the most impact were those based on Bandura's Social Cognitive Theory, especially those using enactive mastery experiences.

In one of the studies evaluated by Dinther et al. (2011), an experimental group and a control group were used to evaluate student motivation and self-efficacy related to physical activity and nutrition. Franko et al. (2008) studied motivation, self-efficacy, physical activity and

nutrition in college students. The participants were randomized using computer software and placed in three groups. The first experimental group was instructed to use a computer-based nutrition program for two web sessions. The second experimental group was instructed to use the computer-based program for two sessions plus a subsequent booster session. The third group was the control group and they used an interactive anatomy website for two sessions. Their study found that the experimental groups demonstrated increases their choices for healthy food and recorded positive changes in motivation to change dietary behaviors (Franko et al., 2008). Significant differences were found between the intervention and control groups on measures of social support, self-efficacy, and encouragement for dietary change. Franko, et al. (2008) stated giving participants the ability to try out new behaviors and allowing them to set goals for themselves that could be updated later seemed to improve self-efficacy.

In another study evaluated by Dinther et al. (2011), Thompson and Dass (2000) evaluated differences and changes in self-efficacy of undergraduate business students using computer simulations and case studies. Their results showed that "total enterprise simulations are an effective way to enhance students' self-efficacy. After the control variables were accounted for, teaching method still made a significant contribution to explaining the post-test scores. So, when students are using simulations, they show an increase in self-efficacy that is significantly larger than gains due to learning via the case method" (Thompson & Dass, 2000, p. 36). Thompson and Dass (2000) believed that both types of instruction, simulation and case studies were experiential in nature, but the simulations seemed to elicit greater self-efficacy responses from students.

Jansen (2012) found that enactive mastery experiences are interpreted by individuals in different ways. Participants in that qualitative study explained that many times mastery experiences required a comparison to their previous learning experiences and these comparisons

were necessary in forming a foundation for the success of the later mastery experience (Jansen, 2012). The concept of mastery required the comparison to a non-masterful experience (Jansen, 2012). For certain types of activities, participants believed that mastery was through interaction with others and was therefore dependent on others (Jansen, 2012). Jansen (2012) stated that any activity and mastery of any kind depends on variables that an actor cannot control directly and might always be conceptualized as an interactive experience.

Challenging experiences in a supportive educational environment can prepare individuals for future challenges. McDonnell and Farrell (2012) studied students who participated in an early college high school (ECHS) program in Texas. Participants in the study stated that before starting the ECHS program one of their fears was that they were not ready for college work. Study participants defined readiness as "their ability to complete rigorous coursework, ability to exhibit high-level thinking, and problem-solving and personal skills, such as time management and discipline" (McDonnell & Farrell, 2012, p. 228). McDonnell and Farrell (2012) reported that those in the study felt the course requirements in the college and high school components of the ECHS were a drastic change from participants' previous educational experiences and completing the challenging ECHS program helped them form what they called a scholarly image. "The acceptance of a scholarly image included being able to conquer past bad habits and feelings of academic and social inadequacy. Developing a sense of satisfaction and pride in one's abilities is a critical aspect in becoming grounded in self-acceptance and gaining a sense of capacity for greater challenges" (McDonnell & Farrell, 2012, p. 234).

Sheu et al. (2018) studied the sources of self-efficacy and outcome expectations in science, technology, engineering, and mathematics (STEM) domains. The authors analyzed 104 studies over a 37-year period and found that of the four methods to build self-efficacy, mastery

experiences and vicarious learning were predictive sources of self-efficacy and outcomes in STEM. The study found that enactive mastery experiences and vicarious learning were received similarly across age groups, but gender did have a moderating difference. Women were found to show a more negative affect loading on direct experiences than men.

Summary

Studies showed that self-efficacy was a necessary condition for many positive attitudes and behaviors individuals need to be successful in life pursuits as well as the formation of a growth mindset. When looking at self-efficacy, the belief is task or domain specific. Of all the methods to develop self-efficacy, the literature revealed that enactive mastery experiences were the most effective. To be considered an enactive mastery experience, the task to be performed must be done by the individual or group under their own effort. For the experience to be effective, the task must be sufficiently challenging and the feedback provided to the individual(s) must be accurate and informative. Research revealed that these experiences in the educational setting could be used to improve student self-efficacy in a domain. It appeared that improvements in student self-efficacy would benefit multiple student success factors simultaneously. Studies reported that amount of previous experiences, the success of those experiences, and gender can be moderating variables on self-efficacy. The reviewed studies encouraged more quantitative studies be done to measure instructional factors effect on self-efficacy. Research urged for more studies to be done that added to the body of knowledge, especially as it related to making learner experiences more effective.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine the effectiveness of using enactive mastery experiences in the classroom to increase college student self-efficacy for learning. Additional areas of interest in the study were to investigate the relationship between self-efficacy for learning and intrinsic motivation, extrinsic motivation, critical thinking, control of learning behaviors, and meta-cognitive self-regulation. Institutional Review Board approval was received to conduct this study (see Appendix A).

The research design was a quasi-experimental, nonequivalent control group design with pre-test and post-test (Fraenkel et al., 2012; Gribbons & Herman, 1996). This design was chosen because the groups studied were intact groups that did not allow for random assignment of participants (Briers, 2017). Gribbons and Herman (1996) stated that quasi-experimental designs are commonly used in the evaluation of educational programs when random assignment is not possible or practical. The use of the pre-test in the design allowed the researcher to assess the differences between the groups at the study start and take initial group differences into account when interpreting study results.

The research method included the following steps:

1. Determination of classes to involve in the experiment prior to semester start.
2. Assignment of classes to one of two groups: control group and treatment group also prior to semester start.
3. Administration of pre-test to all students in all groups in week two of the semester.
4. Classroom instruction to all groups in weeks two through fifteen.

5. Implementation of supplemental, enactive mastery in-class exercises to treatment groups during weeks three through fifteen.
6. Administration of the supplemental demographic questionnaire to all students in all groups in week eleven.
7. Administration of post-test to all students in all groups in week fifteen.

Population

The population for the study were undergraduate students enrolled in introductory agricultural science courses at a large community college in Texas. Participants were enrolled in two sections of Horticulture (HORT), taught by "Instructor H" and two sections of Introduction to Animal Science (ANSC), taught by "Instructor A" during the Fall 2019 semester. Both courses are required in that college's Associate of Science in Agriculture degree. These courses were also options to meet the natural science requirement in the core curriculum at that college and the nearby university that receives many of the college's students as transfers. One section of each course was randomly selected to serve as the treatment group for the course prior to the semester start. The student enrollment by course and section are found in Table 1. Enrollment in the specific sections identified did not place the participant in the study. In order to be considered as part of the study, participants needed to complete both the pre-test and the post-test. All enrolled students received an information sheet (see Appendix B) and were informed that participation was voluntary.

Table 1. *Student Enrollment for Horticulture (HORT) and Animal Science (ANSC) Sections, Fall 2019*

	Section Enrollment
HORT Treatment	40
HORT Control	39
Total HORT	79
ANSC Treatment	40
ANSC Control	39
Total ANSC	79
Total All Courses	158

Treatment

Literature revealed that mastery experiences must involve activities where individuals are behaving in the moment on their own and demonstrating to themselves that they are capable of competing a task related to a goal (Jansen, 2012; Linnenbrink & Pintrich, 2003). Prior to the start of the semester, three instructors of ANSC and two instructors of HORT were asked to identify the top three topics covered in each course that they believed students found the most challenging and, through their experience, did not perform well on academically when assessed. In both courses, instructors identified basic terminology used in the discipline as being difficult for many students to retain. For ANSC, instructors believed students struggled with properly identifying reproductive anatomy of the different species and the calculation of carcass yield grades. Instructors in HORT identified areas of concern were the ability to properly identify plant anatomy, understanding the stages of different biological cycles, and understanding plant propagation techniques.

To aid in retention of terminology for both courses and to serve as an enactive mastery experience, the exercise known as “Questions from a Hat” was developed. This exercise was modeled after start-of-class review sessions by Juntune (2018) in educational psychology. Terms and names of important individuals in the field were placed on one side of index cards while the other side was blank. Students in the treatment groups were asked to self-assign themselves to a group of no more than four persons. The instructor approached each group one at a time. Without looking at the terms on the index cards, a member of the group drew a card from the deck. Without the help of resources, the student was required to tell the instructor everything they knew about the topic they drew. If the student was unable to provide an answer, another member of their group could help. The correctness and completeness of the answer were decided on by the instructor. If no one in the group was able to provide the answer, the question went to the next group. This continued until a correct response was given. Each member of each group was required to take a turn drawing from the deck and attempting to answer a question. If the correct response was given on the first attempt by the first group member, the instructor moved to the next group. The instructor used the exercise for the length of time they felt was appropriate. This exercise was used at least once in weeks three through fourteen of the semester by treatment groups in ANSC and HORT.

The exercise “Identify/Draw It” was developed to aid in improving the ability to accurately identify plant and animal anatomy and biological cycles. This exercise served as the second enactive mastery experience. Students in the treatment groups of ANSC and HORT self-assigned themselves to groups of no more than four persons. Each group was given an eight- and one-half inch by eleven-inch dry erase board and marker. For ANSC participants, each group was given a set of unlabeled diagrams illustrating reproductive tracts of different animal species

and an unlabeled diagram of the estrus cycle on transparency film. HORT participants received unlabeled plant, leaf, and photosynthesis diagrams on transparency film. Each member of the group chose one of the four unlabeled diagrams and placed it on the dry erase board. Without the help of books or notes, each member attempted to label the diagram correctly. Other group members reviewed the student's work against their course materials for correctness. In the case of errors, group members described to the participant how to correct the mistakes. The instructor used the exercise for the length of time they felt was appropriate. This exercise was used at least once in weeks seven through twelve in the ANSC treatment group and weeks four through ten in the HORT treatment group.

The final mastery exercise developed was known as "Show Me". Students in the ANSC treatment group self-assigned themselves to groups of no more than four persons. Each group was given an eight- and one-half inch by eleven-inch dry erase board and marker. Each member of the group was given different carcass information and asked to calculate the yield grade. Students took turns performing the calculations on the dry erase board and demonstrated their work to their group members and the instructor. In the case of errors, group members or the instructor described to the participant how to correct mistakes. The instructor used the exercise for the length of time they felt was appropriate. In the HORT course, students in the treatment group self-assigned themselves to groups of no more than four persons. Each group was assigned a specimen to propagate using a technique of their choice. Each group was instructed to record a two-minute video demonstrating the technique, describing each of the steps, and outlining the expected results at each stage of growth. Every member of the group was required to participate in at least one portion of the exercise. The groups submitted their recordings to the instructor for

review. Participants in the ANSC treatment group used this "Show Me" exercise at least once in week thirteen and fourteen. The HORT treatment group used this exercise once in week thirteen.

Instrumentation

Participants in the study were administered a pre-test (see Appendix C), a demographic questionnaire (see Appendix D), and a post-test (see Appendix E). The pre-test and post-test instruments used questions from the *Motivated Strategies for Learning Questionnaire* (MSLQ) developed by Pintrich et al. (1991). Six constructs from the MSLQ were utilized (see Appendix F). These instruments included items associated with self-efficacy for learning and performance (SEF), metacognitive self-regulation (MET), control of learning beliefs (CLB), extrinsic goal orientation (EGO), intrinsic goal orientation (IGO), and critical thinking (CT) scales. The MSLQ is a self-report instrument that uses a seven-point Likert scale designed to assess college student orientation towards learning and their use of different learning strategies in a college course (Pintrich et al., 1993). The instrument, designed to be given on paper during class, has a total of fourteen scales that can be used together or singly. Duncan and McKeachie (2005) reported that the MSLQ was developed in three major waves of data collection in 1986, 1987, and 1988, from over 1,700 students. The instrument was validated in the winter of 1990 with a sample of 380 college students in thirty-seven different classrooms across fourteen different disciplines. Since its validation in 1990, the MSLQ has been used in different languages, in different countries, and in different settings (Duncan & McKeachie, 2005). Pintric, et al. (1993) reported that the Cronbach's alphas were robust, ranging from .52 to .93 for the fourteen scales. Results of Pintrich et al. (1991) testing of the instrument in 1990 for the scales used in this study are found in Table 2.

Table 2. *Motivated Strategies for Learning Questionnaire (MSLQ) Internal Reliability Coefficients, Correlations with Final Course Grade, and the Number of Items per Construct*

Scale	α	*r*	Number of items
SEF	0.93	0.41	8
MET	0.79	0.30	12
CLB	0.68	0.13	4
EGO	0.62	0.02	4
IGO	0.74	0.25	4
CT	0.80	0.15	5

Note. SEF = self-efficacy for learning; MET = metacognitive self-regulation; CLB = control of learning beliefs; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CT = critical thinking.

Questions from the MSLQ scales were put into Microsoft Excel® and assigned a question number. Using Excel's random number generator, these question numbers were re-arranged to a create a new listing of the questions for the order to use on the pre-test and post-test questionnaire. The MSLQ uses a seven-point Likert scale for response choices. For this study, the seven-point Likert scale was condensed down to a five-point Likert scale to match the available answer choices provided on the Accuscan™ forms used to collect participant responses. Three demographic questions were added to the pre-test to identify gender, academic classification, and the reason for enrolling in the course. The post-test used the same MSLQ questions in the same order as the pre-test but the three demographic questions were removed. The final question on the post-test instrument asked for participants to report their expected final course grade.

The other instrument used in the study was a demographic questionnaire called *Understanding our Students.* This instrument included sixteen questions asking about student background, feelings toward college studies, and outside of class student responsibilities.

Data Collection

The pre-test was composed of thirty-seven questions from the selected sections of the MSLQ and three demographic questions; it was administered in week two of the Fall 2019 semester to all students in the HORT and ANSC sections identified for the study. Only students who attended class on the day of the pre-test were administered the pre-test. The required Texas A&M University Institutional Review Board (IRB) information sheet, Accuscan™ form for responses, and the study's MSLQ questionnaire were distributed to the entire class by the researcher. Students created a unique identifier for the study composed of the first letter of their first name, the first letter of their last name, and four digits of a phone number they use frequently. This served as their proper identification for the study. All information obtained was kept confidential. Participants required approximately fifteen minutes to complete the pre-test. After all participants completed the pre-test, Accuscan™ forms and questionnaires were collected. Participants were encouraged to keep the IRB information sheet.

In week eleven of the Fall 2019 semester, the *Understanding our Students* questionnaire was administered to all students in the identified sections of the two courses. Only students who attended class on the day of the administration completed the *Understanding our Students* questionnaire. The IRB information sheet, an Accuscan™ form for responses, and the questionnaire were distributed to the entire class by the researcher. Students used the unique identifier created for the pre-test as their identification for this questionnaire. All information obtained was kept confidential. Participants required approximately five minutes to complete the questionnaire. After all participants were complete, the Accuscan™ forms and questionnaires were collected. Participants were encouraged again to keep the IRB information sheet.

The post-test consisted of the identical thirty-seven questions from selected sections of the MSLQ in the same order they appeared on the pre-test with the addition of one final question related to expected final course grade. It was administered in week fifteen of the Fall 2019 semester. Only students who attended class on the day of the post-test were administered the post-test. The IRB information sheet, an Accuscan™ form for responses, and the post-test were distributed to the entire class by the researcher. Students used the unique identifier they created for the pre-test and used on the *Understanding our Students* questionnaire as their proper identification for the post-test. All information obtained was kept confidential. Participants required about ten minutes to complete the questionnaire. After all participants were complete, the Accuscan™ forms and questionnaires were collected. Participants were encouraged again to keep the IRB information sheet. Completion rates for each of the three instruments across the four sections are found in Table 3.

Table 3. *Completion Rates for the Three Instruments Used in the Study by Animal Science (ANSC) and Horticulture (HORT) Groups, Fall 2019*

Group	Pre-Test Instrument (*n*)	Completion %	*Understanding Our Students* Demographic Questionnaire (*n*)	Completion %	Post-Test Instrument (*n*)	Completion %
ANSC Trtment	30	75.0	29	72.5	29	72.5
ANSC Control	37	94.9	31	79.5	28	71.8
HORT Trtment	38	95.0	38	95.0	31	77.5
HORT Control	37	94.9	28	71.8	36	92.3
Totals	142	89.9	126	79.7	124	78.5

Note. Trtment = Treatment

Data Analysis

The unique identifiers participants created for the study contained alphabetic letters in the first two positions. The use of Accuscan™ forms in the study were because of participant familiarity of the forms and the ability to scan the forms and convert into digital files. The student identification portion of the Accuscan™ form required the use of only numbers. Prior to analysis, the researcher modified the alphabetic characters in the participant created identifiers into numerals based on the alphabetic characters' order in the alphabet. To easily identify participants' group membership, the researcher added a group number, one through four, at the end of the participants' created identifier. The participants' responses recorded on Accuscan™ forms were processed by the form reader into electronic spreadsheets. The pre-test, post-test, and *Understanding our Students* participant responses were recorded in the spreadsheets as

alphabetic characters. The researcher used Microsoft Excel® logic statements to convert all alphabetic characters into numerals based on the researcher's coding scheme. For the pre-test and the post-test, the scales used contained from as little as four to at most twelve questions to measure each construct. For these learning behavior scales, participants were asked to select the choice that best describes them with "E" being "not very true of me" to "A" being "very true of me". These alphabetic responses were converted into numerals using the Excel logic statements. These converted responses used values from one to five with one being "not very true of me" and five being "very true of me". The researcher then used Excel to condense the items for each construct down to a single score. The questionnaire *Understanding our Students* did not require participant responses to be condensed. Before statistical analysis, the researcher combined all responses for all instruments into a single spreadsheet and removed the group number, the last digit, from each participant identifier. This was done to determine if any participant was common to both courses; ANSC and HORT. While there were no exact matches of participant identification numbers across the groups, one participant identification number only differed by the two final digits, excluding the group number. These numbers corresponded with a participant in the treatment section of the HORT course and a participant in the control section of ANSC. The researcher determined that, while the possibility that the two participants were the same person, the impact on the study was minimal, approximately one percent, and the data for those two participants were left in each group. Once the conversion and condensing were complete, the electronic spreadsheets were imported into IBM's Statistical Package for the Social Sciences (SPSS®).

The data were analyzed to determine selected characteristics of the sample by using frequency counts, percentages, and means. Prior to the analysis, crosstabs descriptive statistics

were used to determine if substantial differences between groups existed. Correlational statistics were used to determine if statistically significant relationships existed between the SEF post-test score and the course subject, participant gender, student classification, top 20% of graduating class, and instructor. Any statistically significant relationships were considered to be covariates and their influence on the SEF post-test score and were accounted for when analyzing the data using Analysis of Variance Repeated Measures. Correlational statistics were used to investigate the possibility of a statistically significant relationships between the other variables of MET, CLB, CT, EGO, and IGO with gender, classification, course subject, and instructor as well as SEF.

CHAPTER IV

RESULTS

Profile of the Population

The population for the study consisted of students enrolled in two sections of ANSC and two sections of HORT at a large community college in Texas during the Fall 2019 semester. The profile for this population was developed based on participant responses on two instruments administered to all students at two different points during the semester. The pre-test instrument, administered in week two of the semester, included three profile questions. Fifteen demographic questions, known as the *Understanding our Students* questionnaire, were administered during week eleven. Only students who attended classes on the days of the administration completed the pre-test and *Understanding our Students* questionnaire. No attempt was made later to collect information from participants from any section.

Prior to the start of the semester, the researcher selected one section of ANSC and one section of HORT to serve as the treatment groups for the study. The remaining sections of each course served as the control groups. The responses on the pre-test revealed that all groups had slightly more female students than males and that the majority of the participants in each group identified as being academically classified as a college sophomore. Pre-test responses to demographic and profile questions by groups are found in Table 4.

Table 4. *Participant Gender and Academic Classification for Horticulture (HORT) and Animal Science (ANSC) Groups, Fall 2019*

	HORT Treatment (*n*)	%	HORT Control (*n*)	%	ANSC Treatment (*n*)	%	ANSC Control (*n*)	%
Female	20	52.6	20	54.1	17	56.7	21	56.8
Male	18	47.4	17	45.9	13	43.3	16	43.2
Freshman	13	34.2	8	21.6	12	40.0	14	37.8
Sophomore	22	57.9	22	59.5	17	56.7	19	51.4
Junior	3	7.9	7	18.9	1	3.3	4	10.8

The items on the *Understanding our Students* questionnaire related to characteristics that literature and practical experience revealed could influence engagement, attitude, and self-efficacy towards learning in college such as work/life demands, prior experiences with college coursework, high school academic ranking, and background. All students present in classes on the day of the administration were provided the questionnaire. Responses for HORT groups are found in Table 5 and those for ANSC participants are found in Table 6. Results based on responses to the *Understanding our Students* questionnaire found the group with the greatest percentage of working students was the HORT control group. The only group to have married participants and those with children were in the HORT treatment group. The HORT control group had the lowest percentage of participants who graduated in the top twenty percent of their high school graduating class. Participants in ANSC treatment and control groups had the largest percentage of those who always knew they would attend college, listed in the table as "College Bound." The ANSC treatment group had the largest percentage of participants with generally positive first college experiences. The HORT control group had the largest percentage of participants with a generally negative first college experience. This group also had largest percentage of responses relating to college being constantly stressful.

Table 5. *Profile Question Responses on Understanding our Students Questionnaire for Horticulture (HORT) by Group, Fall 2019*

	HORT Treatment *n* = 38	%	HORT Control *n* = 28	%
Work	22	57.9	19	67.9
Married	3	7.9	0	0.0
Children	4	10.5	0	0.0
Rural Background	14	36.8	14	50.0
Urban Background	3	7.9	2	7.1
Combination Background	21	55.3	12	42.9
First Generation	16	42.1	6	21.4
Top 20%	17	44.7	8	28.6
Dual Credit	24	63.2	17	60.7
College Bound	31	81.6	21	75.0
Feared College	19	50.0	17	60.7
Constant College Stress	12	31.6	12	42.9
Some College Stress	21	55.3	16	57.1
Positive First Experience	24	63.2	13	46.4
Negative First Experience	1	2.6	5	17.9

Note: Work = Participant employment while attending college; Top 20% = Top 20% of High School Graduating Class; Dual Credit = Participation in Dual Credit; College Bound = Participant always planned to attend college; Feared College = Participant feared attending college; Constant College Stress = Participant feels constant stress related to college attendance; Some College Stress = Participant feels some stress related to college attendance; Positive First Experience = Participant felt their first experience with a college course was relatively positive; Negative First Experience = Participant felt their experience with a college course was relatively negative.

Table 6. *Profile Question Responses on Understanding our Students Questionnaire for Animal Science (ANSC) by Group, Fall 2019*

	ANSC Treatment $n = 29$	%	ANSC Control $n = 31$	%
Work	17	58.6	19	61.3
Married	0	0.0	0	0.0
Children	0	0.0	0	0.0
Rural Background	8	27.6	9	29.0
Urban Background	6	20.7	8	25.8
Combination Background	15	51.7	17	54.8
First Generation	9	31.0	4	12.9
Top 20%	12	41.4	14	45.2
Dual Credit	17	58.6	15	48.4
College Bound	27	93.1	29	93.5
Feared College	11	37.9	13	41.9
Constant College Stress	9	31.0	8	25.8
Some College Stress	18	62.1	21	67.7
Positive First Experience	22	75.9	23	74.2
Negative First Experience	3	10.3	2	6.5

Note: Work = Participant employment while attending college; Top 20% = Top 20% of High School Graduating Class; Dual Credit = Participation in Dual Credit; College Bound = Participant always planned to attend college; Feared College = Participant feared attending college; Constant College Stress = Participant feels constant stress related to college attendance; Some College Stress = Participant feels some stress related to college attendance; Positive First Experience = Participant felt their first experience with a college course was relatively positive; Negative First Experience = Participant felt their experience with a college course was relatively negative.

To be included in the study, participants needed to complete both the pre-test and the post-test. Across the four groups, 100 students completed both parts and were considered part of the study. The HORT portion of the study included 28 participants in each group. The control

group in ANSC had 25 participants and the treatment group had 19. Of these 100 study participants, only 79 participants completed the *Understanding our Students* instrument administered in week eleven. Profile data was available for 80% of the ANSC control group and 79% of the HORT treatment, HORT control, and ANSC treatment groups (see Tables 7 and 8).

Table 7. *Horticulture (HORT) Study Participants' Responses to Gender, Academic Classification, and Demographic Questions by Group, Fall 2019*

	HORT Treatment *n* = 22	%	HORT Control *n* = 22	%
Female	13	59.1	12	54.5
Male	9	40.9	10	45.5
Freshman	6	27.3	4	18.2
Sophomore	13	59.1	14	63.6
Junior	3	13.6	4	18.2
Work	12	54.5	16	72.7
Married	1	4.5	0	0.0
Children	2	9.0	0	0.0
Rural Background	9	40.9	11	50.0
Urban Background	2	9.0	1	4.5
Combination Background	11	50.0	10	45.5
First Generation	8	36.4	5	22.7
Top 20%	10	45.5	8	36.4
Dual Credit	17	77.3	14	63.6

Note: Work = Participant employment while attending college; Top 20% = Top 20% of High School Graduating Class; Dual Credit = Participation in Dual Credit.

Table 8. *Animal Science (ANSC) Study Participants' Responses to Gender, Academic Classification, and Demographic Questions by Group, Fall 2019*

	ANSC Treatment $n = 15$	%	ANSC Control $n = 20$	%
Female	10	66.7	11	55.0
Male	5	33.3	9	45.0
Freshman	4	26.6	11	55.0
Sophomore	10	66.7	9	45.0
Junior	1	6.7	0	0.0
Work	8	53.3	10	50.0
Married	0	0.0	0	0.0
Children	0	0.0	0	0.0
Rural Background	5	33.3	5	25.0
Urban Background	3	20.0	4	20.0
Combination Background	7	46.7	11	55.0
First Generation	4	26.7	2	10.0
Top 20%	6	40.0	10	50.0
Dual Credit	9	60.0	11	55.0

Note: Work = Participant reports employment while attending college; Top 20% = Top 20% of High School Graduating Class; Dual Credit = Participation in Dual Credit.

Horticulture Results

The purpose of this study was to determine the effectiveness of using enactive mastery experiences in the classroom to increase college student self-efficacy for learning. Additional areas of interest in the study were to investigate the relationship between self-efficacy for learning and intrinsic motivation, extrinsic motivation, critical thinking, control of learning behaviors, and meta-cognitive self-regulation. The objectives of the study were:

1. Determine the effectiveness of enactive mastery experiences on self-efficacy of community college students enrolled in undergraduate agriculture courses,

2. Compare the impact of enactive mastery experience on self-efficacy in different agriculture courses, and
3. Investigate the relationships between classroom experiences and student characteristics with beliefs about self-efficacy, types of goal orientation, control of learning, critical thinking, and metacognition.

The pre-test administered to the treatment and control groups in week two of the semester provided baseline information. For all learning behavior scales on the pre-test and post-test instruments, participants were asked to select the choice that best describes them using ratings from one to five with one being "not very true of me" and five being "very true of me". Results for the HORT groups are found in Table 9.

Table 9. *Horticulture (HORT) Learning Behaviors Pre-Test Mean Scores and Standard Deviations by Group, Fall 2019*

	Treatment M $n = 28$	Treatment SD	Control M $n = 28$	Control SD
MET	3.49	0.41	3.51	0.43
EGO	4.50	0.55	4.36	0.59
CLB	4.35	0.43	4.18	0.52
CT	3.27	0.80	3.30	0.68
IGO	3.61	0.88	3.26	0.72
SEF	4.29	0.51	4.09	0.50

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

As shown in Table 9, the HORT treatment group, N=28, had highest mean scores for EGO, CLB, and SEF. The control group, N=28, also had highest mean scores in the same areas. The lowest mean score for the treatment group was in the area of critical thinking (CT). The

lowest mean scores for the control group was IGO. Standard deviations for MET, CLB, and SEF for the treatment group showed mean scores with stronger central tendency than IGO and CT. The control group pre-test scores showed stronger central tendency in MET, CLB, and SEF. The post-test administered in week fifteen of the sixteen-week semester, shown in Table 10 and Table 11, found the HORT control group reported lower mean scores for three out of the six measures when compared to the pre-test scores. The control group showed gains in the areas of MET, CT, and IGO. The control group's largest decrease in mean scores were in the areas of CLB and SEF. For the HORT treatment group, mean scores declined from pre to post in all areas except CT. The largest decline for this group was in CLB and the second largest decline was in the post-test mean score for SEF. For the post-test scores, standard deviations in the treatment group were larger for five out of six measures. The standard deviation for EGO was 0.01 lower than the pre-test measure. In the control group, the standard deviations for all measures were larger.

Table 10. *Horticulture (HORT) Control Group, n = 28, Learning Behaviors Post-Test Mean Scores, Standard Deviations, and Change from Pre-Test Mean Scores, Fall 2019*

	Control M	Control SD	Change from Pre-Test
MET	3.61	0.55	+0.10
EGO	4.24	0.70	-0.12
CLB	3.73	0.79	-0.45
CT	3.35	0.90	+0.05
IGO	3.45	0.81	+0.19
SEF	3.67	0.71	-0.42

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

Table 11. *Horticulture (HORT) Treatment Group, n = 28, Learning Behaviors Post-Test Mean Scores, Standard Deviations, and Change from Pre-Test Mean Scores, Fall 2019*

	Treatment M	Treatment SD	Change from Pre-Test
MET	3.45	0.66	-0.04
EGO	4.25	0.54	-0.25
CLB	3.69	0.73	-0.66
CT	3.31	0.99	+0.04
IGO	3.58	0.95	-0.03
SEF	3.80	0.88	-0.44

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

The responses for both HORT groups were combined and then analyzed together. Correlations were used to identify any statistically significant relationships between variables at the $\alpha = 0.05$ level. Results showed that statistically significant relationships existed between SEF post mean score and expected course grade and SEF post mean score and the participants' first college experience (see Table 12). In both cases, the relationship was positive revealing that more positive outcomes with respect to expected course grade and first college experiences related to higher post SEF scores. When analyzing the relationship between the learning behaviors and the SEF post mean score, all showed statistically significant relationships. The strongest relationship between learning behaviors for HORT participants were found between the SEF post score and the CLB post score, $r = 0.59$.

Table 12. *Horticulture (HORT) Groups, n =56, Correlation Coefficients and p values for Self-Efficacy for Learning (SEF) Post-Test Score and Participant Profile Variables and Other Learning Behaviors Post-Test Scores, Fall 2019*

	r	*p*
Group	0.08	0.55
Gender	-0.01	0.93
Classification	0.14	0.29
Expected Course Grade	0.62	0.001**
Work	-0.27	0.08
Married	0.23	0.14
Children	0.27	0.08
Background	-0.05	0.79
Stress	-0.11	0.47
First Generation	0.11	0.50
College Bound	-0.11	0.47
Dual Credit	-0.12	0.43
First College Experience	0.32	0.03*
MET	0.30	0.03*
EGO	0.31	0.02*
CLB	0.59	0.01*
CT	0.35	0.008**
IGO	0.29	0.03*

Note. All *p* values in this table are two-tailed. *Correlation is significant at 0.05 level. **Correlation is significant at the 0.01 level.

The primary purpose of the study was to investigate the effect of enactive mastery experiences on student self-efficacy for learning. When comparing HORT groups SEF mean scores from pre-test to post-test, the results showed no statistically significant difference between the two groups, $p = .93$. The SEF mean score decreased in the treatment and control groups from pre-test to post-test (see Table 13). The enactive mastery experiences used in the treatment group of HORT had no statistically significant impact on self-efficacy beliefs.

Table 13. *Horticulture (HORT) Pre-Test Self-Efficacy for Learning (SEF)Mean Scores and Post-Test Self-Efficacy for Learning (SEF) Mean Scores Comparison by Group, Fall 2019*

	Control *n* = 28	Treatment *n* = 28
Pre- Test SEF	4.09 (0.50)	4.24 (0.51)
Post- Test SEF	3.67 (0.71)	3.80 (0.88)

Animal Science Results

Participants in the ANSC course were administered the same pre-test and post-test instruments at the same intervals during the semester as the HORT participants. When evaluating the pre-test mean scores, the ANSC treatment group had highest mean scores in the areas of EGO, SEF, and CLB. The ANSC control group also had the highest mean scores in the same areas. Both ANSC groups showed the lowest mean score in the area of CT (see Table 14). The standard deviations for both groups were similar except in the areas of CT and IGO.

Table 14. *Animal Science (ANSC) Learning Behaviors Pre-Test Mean Scores and Standard Deviations by Group, Fall 2019*

	Treatment M *n* = 19	Treatment SD	Control M *n* = 25	Control SD
MET	3.56	0.40	3.41	0.53
EGO	4.47	0.45	4.57	0.49
CLB	4.16	0.53	4.17	0.51
CT	3.40	0.59	3.16	0.70
IGO	3.91	0.49	3.56	0.65
SEF	4.46	0.43	4.37	0.49

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

When comparing the pre and post-test means in Table 15 and 16, the ANSC treatment group showed a decrease in mean scores in MET, CT, IGO, and SEF. For ANSC treatment group, the area of EGO showed no change from pre to post and CLB rose by 0.14. The largest decreases in mean score for the ANSC treatment group was in the areas of CT and IGO. The ANSC control group showed lower post-test mean scores for all areas except CT. The largest decrease in mean score for the control group occurred in the area of SEF and CLB. The standard deviations for post-test mean scores increased when compared to the pre-test scores.

Table 15. *Animal Science (ANSC) Control Group, n = 25, Learning Behaviors Post-Test Mean Scores, Standard Deviations, and Change from Pre-Test Mean Score, Fall 2019*

	Control M	Control SD	Change from Pre-Test
MET	3.29	0.59	-0.12
EGO	4.41	0.57	-0.16
CLB	3.92	0.72	-0.25
CT	3.26	0.76	+0.10
IGO	3.49	0.82	-0.07
SEF	4.07	0.56	-0.30

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

Table 16. *Animal Science (ANSC) Treatment Group, n =19, Learning Behaviors Post-Test Mean Scores, Standard Deviations, and Change from Pre-Test Mean Scores, Fall 2019*

	Treatment M	Treatment SD	Change from Pre-Test
MET	3.48	0.57	-0.08
EGO	4.47	0.67	0.00
CLB	4.30	0.56	+0.14
CT	3.23	0.60	-0.17
IGO	3.74	0.71	-0.17
SEF	4.42	0.47	-0.04

Note. MET = metacognitive self-regulation; EGO = extrinsic goal orientation, IGO = intrinsic goal orientation; CLB = control of learning beliefs; CT = critical thinking; SEF = self-efficacy for learning.

Responses for both groups in ANSC were combined for further analysis. Correlations were used to identify any statistically significant relationships between variables at the α=0.05 level. Results showed (see Table 17) that statistically significant relationships existed between SEF post-test mean score and expected course grade, r = 0.53, and SEF post-test mean score and Group, r = 0.33. When analyzing the relationship between the learning behaviors, statistically significant relationships existed between EGO post-test mean score and SEF post-test mean score and CLB post-test mean score and SEF post-test mean score. The strongest relationship between learning behaviors for ANSC participants were found between SEF post-test mean score and CLB post-test mean score, r = 0.55.

Table 17. *Animal Science (ANSC) Groups, n = 44, Correlation Coefficients and p values for Self-Efficacy for Learning (SEF) Post-Test Score and Participant Profile Variables and Other Learning Behaviors Post-Test Scores, Fall 2019*

	r	*p*
Group	0.33	0.03*
Gender	0.15	0.35
Classification	-0.14	0.37
Expected Course Grade	0.53	0.001**
Work	-0.10	0.58
Married	n/a	n/a
Children	n/a	n/a
Background	0.22	0.20
Stress	-0.03	0.87
First Generation	0.24	0.17
College Bound	-0.30	0.08
Dual Credit	0.15	0.41
First College Experience	0.09	0.60
MET	0.00	0.99
EGO	0.36	0.02*
CLB	0.55	0.001**
CT	0.08	0.60
IGO	0.21	0.18

Note. All *p* values in this table are two-tailed. *Correlation is significant at 0.05 level. **Correlation is significant at the 0.01 level.

Considering the primary purpose of the study was to investigate the effect of enactive mastery experiences on student self-efficacy for learning, the results showed for ANSC groups there was no statistically significant difference in SEF mean scores between the two groups, p = 0.10. Table 18 shows the change in SEF mean scores from pre-test to post-test for both ANSC groups.

Table 18. *Animal Science (ANSC) Pre-Test Self Efficacy for Learning (SEF) Mean Scores and Post-Test Self-Efficacy for Learning (SEF) Mean Scores Comparison by Group, Fall 2019*

	Control n = 25	Treatment n = 19
Pre-Test SEF	4.37 (0.49)	4.45 (0.43)
Post- Test SEF	4.06 (0.56)	4.42 (0.47)

Combined Results

In the last phase of analysis, the data for treatment and control groups of HORT and ANSC were combined. Correlations were used to identify any statistically significant relationships between variables at the α = 0.05 level. The first correlation compared SEF post-test mean scores of all groups to involvement in mastery experiences. This was done to determine a possible relationship between exposure to supplemental exercises and SEF. Results showed no statistically significant relationship between the two variables, r = 0.13, p = 0.19. The second correlation compared the SEF post-test mean scores to instructor regardless of group. This correlation found a statistically significant relationship, r = - 0.33, p = 0.001. The negative relationship between SEF post-test mean scores and instructor signified that participants in sections taught by Instructor H would have lower SEF post-test mean scores than those taught by Instructor A. When comparing SEF post-test mean scores and participant academic

classification, the results showed no statistically significant relationship, r = - 0.18, p = 0.86. The SEF mean scores from pre to post between those who received the supplemental mastery experiences in their course and those who did not were analyzed. The results found that there was no statistically significant difference from pre-test to post-test in SEF because of the treatment, p = 0.40. The statistical tests reported a partial eta squared of 0.01 and power of 0.14. When analyzing the change in SEF mean scores from pre to post by instructor, there was no statistically significant difference, p = 0.06. These tests reported a larger effect size and higher power, partial eta squared of 0.04 and power of 0.46, but values were still considered very low.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the effectiveness of using enactive mastery experiences in the classroom to increase college student self-efficacy for learning. Additional areas of interest in the study were to investigate the relationship between self-efficacy for learning and intrinsic motivation, extrinsic motivation, critical thinking, control of learning behaviors, and meta-cognitive self-regulation. The objectives of the study were:

1. Determine the effectiveness of enactive mastery experiences on self-efficacy of community college students enrolled in undergraduate agriculture courses,
2. Compare the impact of enactive mastery experience on self-efficacy in different agriculture courses, and
3. Investigate the relationships between classroom experiences and student characteristics with beliefs about self-efficacy, types of goal orientation, control of learning, critical thinking, and metacognition.

The significance of the study related to the push for colleges and universities to find new ways to help students persist, succeed, and complete their degrees. Research showed that students need a mindset oriented toward growth in order to persist through the trials of higher education (CCCSE, 2019). The critical factor needed for a growth mindset was self-efficacy (Dweck, 2015). Previous research showed that the college classroom could be used to influence student self-efficacy (Dinther et al., 2011). Dinther et al. (2011) stated that their review of literature found that classroom activities that were based on Bandura's Social Cognitive Theory description of enactive mastery experiences were the most effective of all methods. Enactive

mastery experiences are defined as non-simulated, singular events controlled by an individual's or individuals' own actions that contributes to the attainment of an intermediate or long-term goal (Jansen, 2012). These experiences allowed the individual to make a judgement of their own competence and ability regarding the task. Other research found that success in challenging experiences in a supportive environment prepared individual for future challenges. McDonnell and Farrell (2012) found that a sense of satisfaction and pride in one's abilities gave individuals a boost to handle future challenges.

The population for the study consisted of 158 students enrolled in introductory agricultural science courses at a large community college in Texas during the Fall 2019 semester. The two courses used in the study were Introduction to Animal Science (ANSC) and Horticulture (HORT). The sections of the ANSC course were taught by Instructor A and the sections of the HORT course were taught by Instructor H. Each instructor had two sections of the course that met on the same days and locations during the semester. To be considered as part of the study, participants in each section needed to complete both the pre-test and the post-test administrations during the semester. Of the 158 students enrolled in the two courses, 100 completed both the pre-test and post-test. The HORT portion of the study included 56 participants; 28 in the treatment group and 28 in the control group. The ANSC portion had 44 participants; 19 in the treatment group and 25 in the control group.

The research design used was a quasi-experimental, nonequivalent control group design with pre-test and post-test (Gribbons & Herman, 1996). This type of design was the most appropriate when evaluating the effectiveness of a treatment on intact groups were random assignment is not possible or practical (Gribbons & Herman, 1996).

Participants in the treatment groups of each course were exposed to three different supplemental, in-class exercises that incorporated the necessary components of enactive mastery experiences as defined by literature. The participants in the control groups were only exposed to the standard course curriculum. The three enactive mastery activities were conducted during weeks three through fourteen of the sixteen-week Fall 2019 semester.

Three instruments were used to collect data in all sections: the pre-test, *Understanding our Students*, and the post-test. The pre-test and the post-test included thirty-seven questions related to self-efficacy for learning, metacognitive self-regulation, control of learning beliefs, intrinsic goal orientation, extrinsic goal orientation, and critical thinking taken from the *Motivated Strategies for Learning Questionnaire* (MSLQ) developed by Pintrich et al. (1991). The validity and reliability of the pre-test, post-test questions from MSLQ were tested and results reported in 1993. Due to its extensive and documented use in studies of college students over the years, the researcher chose to take the published results at face value. The MSLQ asked participants to respond to questions using a Likert-type scale. The seven-point Likert scale of the original MSLQ was modified to a five-point scale for the study. Responses for the questions ranged from one to five with one being "not very true of me" and five being "very true of me". For the pre-test, three questions on gender, academic classification, reason for course enrollment were added to the end of the set of MSLQ questions. The pre-test was administered in week two of the semester. At week eleven of the semester, all participants were administered the *Understanding our Students* questionnaire. This instrument included sixteen questions asking about student background, feelings toward college studies, and outside of class student responsibilities. The post-test instrument was the identical order of thirty-seven MSLQ questions from the pre-test with one additional question at the end regarding expected final course grade.

The post-test was administered in week fifteen of the semester. Participants in all groups were administered the pre-test, post-test, and *Understanding our Students* instruments using the same methods, procedures, and administrator each time. The pre-test and post-tests required approximately fifteen minutes per instrument administration. The *Understanding our Students* questionnaire required approximately five minutes to complete. The data was collected on paper Accuscan™ forms and the responses from all instruments were kept confidential.

The Accuscan™ forms from each administration were converted into Microsoft Excel® files. The researcher converted any and all alphabetic characters to numbers using logic statements in Excel prior to importing data into SPSS®. Once in SPSS, the researcher analyzed each course individually first then combined the data to analyze the overall impact. Descriptive statistics were used to describe the characteristics and responses of the participants in each course and group within a course. Correlational statistical tests were ran to investigate possible relationships between self-efficacy for learning and participant characteristics and other learning beliefs. These correlations were done at the course and overall levels. Analysis of variance repeated measures was used to examine the possible differences between the treatment and control groups in the study.

Conclusions

The results of demographic questions on the pre-test instrument revealed that all groups in the study were comprised of more female than male students and more than 50% of the participants identified as being classified a college sophomore. The *Understanding our Students* questionnaire provided information relating to "stressors," feelings toward college, and prior educational experiences that literature showed affected self and learning beliefs. Participant responses in all groups in the study revealed that more than 50% of students enrolled in the

courses were working outside of attending class, but very few were married or had children. For both ANSC and HORT, approximately 30% of participants reported they felt college was constantly stressful. The percentage of students who participated in dual credit courses while in high school was greater than 50%, but the percentage of students in the top twenty percent of their high school graduating class was less than 50%. In one instance, the HORT control group had less than 30% of the participants reporting they were in the top twenty percent of their high school graduating class.

The pre-test and post-test instruments contained thirty-seven questions related to self-efficacy for learning, control of learning beliefs, extrinsic goal orientation, intrinsic goal orientation, critical thinking, and metacognitive self-regulation. Participants were asked to rate their beliefs about themselves in the course on a scale of one to five with one being "not very true of me" to five being "very true of me". The results of the pre-test found that HORT control and treatment group members responded above a four in the areas of SEF, CLB, and EGO. There were no pre-test mean scores below a three for any measure for the all the HORT groups. The lowest pre-test mean score was in IGO for HORT control and CT for the HORT treatment group. When comparing the pre-test mean scores to the post-test mean scores, the HORT control group scores increased in the areas of MET, CT and IGO. The SEF mean score for the group fell by 0.42 from pre-test to post-test; the second largest decline. The largest mean score decline occurred in CLB. For the HORT treatment group, all post-test mean scores were lower except for CT. The SEF mean score fell in this group by 0.44, which was also the second largest decline in mean score. The CLB also had the largest decline in mean score from pre-test to post-test for the HORT treatment group. Correlational analysis at the $\alpha = 0.05$ level found statistically significant relationships between SEF post-test mean scores and expected course grade, first college

experiences, MET, EGO, IGO, CLB, and CT for the HORT groups. The analysis of variance at the $\alpha = 0.05$ level found no statistically significant difference between the HORT treatment and control groups self-efficacy for learning mean scores from pre to post. The treatment used did not produce statistically significant differences in self-efficacy for learning.

In ANSC, the participants in both the control and treatment groups reported pre-test mean scores greater than four in the areas of EGO, CLB, and SEF. The lowest pre-test mean score for both groups in ANSC was in CT. When comparing the pre-test and post-test mean scores, all scores declined in ANSC control except for CT. The largest decline from pre-test to post-test was in the area of SEF with 0.30. In the ANSC treatment group, EGO was unchanged from pre-test to post-test, CLB increased while all other mean scores declined. The largest decline came in the areas of CT and IGO. The least amount of decline in mean score for ANSC treatment group occurred in SEF. For ANSC groups, the correlational analysis at the $\alpha = 0.05$ level found statistically significant relationships between SEF post-test scores and group membership, expected course grade, EGO, and CLB. The analysis of variance at the $\alpha = 0.05$ level found no statistically significant difference between the ANSC treatment and control groups SEF mean scores from pre to post. The treatment used did not produce statistically significant differences in self-efficacy for learning.

When looking at both courses and all groups combined, correlational analysis at the $\alpha = 0.05$ level found statistically significant relationships between SEF post-test mean scores and instructor. The relationships between SEF post-test mean scores and exposure to mastery experiences and SEF post-test mean scores and academic classification were not statistically significant. The analysis of variance comparing SEF pre-test and post-test mean scores for those exposed to mastery experiences and those that were not exposed found no statistically significant

difference at the $\alpha = 0.05$ level. When pre and post SEF mean scores were compared by instructor, the analysis of variance showed no statistically significant difference at the same confidence level, $p = 0.06$.

Implications

The results of the study found that the treatment of using supplemental, enactive mastery experiences had no statistically significant difference on participant SEF post-test mean scores. The unexpected, and perhaps more interesting findings, were that that SEF post-test mean scores fell for all groups, treatment and control, for all courses and that a statistically significant relationship exists between SEF post-test mean scores and instructor. All these results combined cause the researcher to pose more questions, draw more implications about importance of teaching on learning, and provide the researcher with a wealth of recommendations for the future.

When considering the purpose of the study and the original objectives, the first questions relate to the supplemental exercises themselves and their implementation. The results of the study provided evidence that mastery experiences were not effective in improving self-efficacy for learning (SEF). If these results were reviewed by a skeptic, their first comment might be it was not that the mastery experiences failed to be effective but rather the supplemental exercises themselves were not effective. This interpretation could come from a range of angles. The experiences might not be representative of a true mastery experience. Another view would be that the content identified by the course instructors was not the content students needed the most help with. Still another view could be that the exercise developed was not appropriate for the content If any or all of these views are correct, mastery experiences could still be effective, but the application used, the current supplemental exercises, were not. If the study had used different

supplemental exercises would the results have been the same? Future studies should use mastery experiences but different, supplemental exercises.

Other issues related to the exercises were the implementation and use by the instructors. Key to the study were the requirements that the course instructors use the supplemental exercises as they were designed, did not impose any of their own personal biases for or against the exercises to participants, and that only the treatment groups were given access to the supplemental exercises. If instructors did not use the exercises as designed, the results could have been affected. If the instructors imposed knowingly or unknowingly any negative bias against the exercises, the results could have been affected. If treatment and control groups either all received the exercises or if the treatment groups were not given the exercises, the results could have been affected. There is a possibility that the instructors modified or removed portions of the exercises or made them graded activities. It is also possible that while the instructors stated that they did the supplemental activities in the treatment groups, in reality they did not. The researcher was not present at every class meeting of each group to verify that the exercises were conducted as designed or that the duration and frequency recorded by the course instructors were accurate. Along this line, it is worth considering the role of instructor affect toward the exercises and the impact on use and effectiveness. While the ANSC instructor did have input during the development phase of the exercises in terms of content covered, the instructor did not develop the exercises for use in their course. The HORT instructor had no input on the course exercises. The attitudes towards the exercises by the course instructors could have influenced how, when, and if they were used. If instructors did not fully believe in the merits or possible effectiveness of the exercises, their lack of enthusiasm could have indirectly messaged participants that the activities did not warrant attention or adequate participation. The instructors' behaviors or verbal

introduction of the exercises could have also unintentionally biased the participants against them. Proper use of the exercises required "buy in" from instructors. Instructors could have stated overtly to the researcher one belief but had a different belief covertly. The possible lack of buy in could have caused the instructors not to use the exercises at all.

Considering mastery experiences, while literature has shown them to be the most effective, there are situations where effectiveness can be diluted. Usher and Pajares (2008) found that in mathematics and science, males responded more positively to mastery experiences than females. Men tended to rely on personal accomplishments as a basis for confidence. Vicarious experiences and social persuasion were more powerful influences on women's confidence in typically male dominated fields. The use of mastery experiences alone in the treatment might not have been most effective method to build self-efficacy given the high percentage of female participants in the courses. The subject matter covered in the course is natural science based and this together with course demographics might have caused the SEF post-test mean scores in all sections to decline.

The decline in SEF post-test mean scores across all groups raises questions regarding the timing of the post-test administration. Declining SEF scores during a semester is not an unheard-of event. Putwain and Sander (2016) reported that self-efficacy scores for undergraduate chemistry students declined over the course of a college semester. In that study, the authors believed the declining scores related to an over-inflated view of self-efficacy of the students at the start of the semester. In other words, "the students did not know what they did not know" and throughout the semester gained a more accurate picture of their skills and abilities related to the course. This type of phenomenon could have occurred with the current study participants. One method to consider for future studies would be to look at SEF retrospectively by having

participants complete an SEF assessment immediately after a supplemental exercise that asks them about their change in SEF because of the activity.

The decline in SEF post-test mean scores across all groups could be the signal of a different, underlying issue that influences student effort and beliefs. The role of stress could be affecting college students and these study participants much more than anticipated. Usher and Pajares (2008) found that while mastery experiences were the most influential sources of self-efficacy for students, psychological mechanisms at work can affect self-efficacy. In their study, self-efficacy was influenced by emotional states such as anxiety, stress, fatigue, and mood. Higher levels of anxiety, stress, and fatigue undermined self-efficacy. Bandura (1982, 1993, 1997, 2001) stated that self-efficacy is strongly influenced by the individual's emotional state and the ideal level of arousal is not too much nor too little. The timing of the post-test administration during week fifteen of the sixteen-week semester could be influencing the results. At the community college where the study was conducted, all students are required to complete comprehensive final exams during week sixteen of the semester. For all students, the time leading up to final exams at the end of the semester causes stress levels to rise. Students and faculty alike are more fatigued and their mood is affected by the desire to finish the semester promptly and enjoy the winter break between semesters. In this study, the issue of stress could be much larger than just related to final exams and the end of a semester. The results of the *Understanding our Students* questionnaire revealed that over 30% of participants in all groups reported stress related to college. The effects of stress could be undermining the effectiveness of the intervention in the treatment groups as well as influencing the beliefs of the control groups.

At the beginning, this study pointed to self-efficacy beliefs as being the missing component needed to influence persistence and effort in college courses. However, these results

seem to point to other issues, like stress and anxiety, as being factors to consider. The study by Putwain and Sander (2016) provided insights. These authors found the decline in SEF scores were more pronounced for participants entering an unknown environment. Some might believe this to be irrelevant to this study given that the *Understanding our Students* questionnaire found that the majority of study participants were college sophomores and many had taken college courses by dual credit. Their question might be "how are the courses used in the study an unknown environment?" especially for college sophomores. There are two issues to consider. First, while academically the students are considered college sophomores, there is a strong likelihood they are newly graduated high school students that have left home for the first time. The second is that their previous college coursework was not the typical college course experience. Even though every transcript records credits the same, not all college credit is identical. Dual credit courses are college courses that cover the same content as the course taught on the college campus by college faculty, but not all dual credit courses produce the same environment as the typical college course taught on a college campus and by college faculty. Many dual credit courses are taught at a student's high school and increasingly are being taught by a high school faculty member who is credentialed to teach the course rather than a college faculty member. For students taking college courses at their high school during their school day, the environment is known. In the case of the instructor being the student's high school instructor, the instructor and the environment are both known. The stress to those students is relatively low compared to the college course on the college campus taught by the college instructor. In some cases, dual credit courses offered at some high schools are taught solely on-line and the dual credit students do not step foot on a college campus or interact synchronously with other students or the college faculty at any time. This also provides a relatively less stressful environment

compared to the college campus, and face to face interaction with other students and instructors. These examples lead to the possibility that the lower stress environment of dual credit at the high school does not prepare students for courses taught on actual college campuses. This study on the community college campus with the courses being taught by community college faculty could have been interpreted by study participants as an unknown environment. This coupled with other stressors related to leaving home for the first time and working to pay for living and college expenses could have influenced their self-efficacy scores from pre to post.

The final finding that warrants discussion is the statistically significant relationship between the SEF post-test mean scores and instructor. Literature revealed that classroom environment and instructor personality influence student behavior (Hodges & Hand, 2005; Kaynardag, 2017; Kim et al., 2018; Knowles et al., 2015; McKeachie et al., 1986; McKeachie, 2003; Orange & Ramalho, 2013; Woolfolk, 2017). The instructors for the two courses were different in terms of years of teaching experience, gender, education level, classroom demeanor, and personality. The HORT sections of the study were taught by a female instructor holding a doctoral degree with approximately one year of teaching experience. Her personality, education level, and level of classroom experience created a different course environment than the ANSC instructor. The ANSC instructor was male, holder of a master's degree, and had more than five years of teaching experience. Prior to teaching, the ANSC instructor worked as a county extension agent. His classroom environment was much less formal and was more similar to an extension type workshop. The HORT instructor had no prior career experience working with adults in a learning environment. She structured the classroom environment more like a university classroom. Peaslee (2017) found that for community college students the interactions with faculty were important. That study found a relationship between confirming behaviors of

faculty in the classroom and student reported self-efficacy. This relationship between faculty confirmation and student self-efficacy was particularly strong for female and first-generation college students. The population of the study was majority female and enrolled in a community college. Participants in the HORT sections also had a higher concentration of self-identified first-generation students. This study and the previous literature provide evidence that instructors are an integral component of college learning and that student success. These results encourage higher education administrators to place more value and importance on good teaching. Choosing only those who are content specialists does not guarantee that students will engage and persist in courses. College students, just as their more inexperienced counterparts in early childhood and K-12 education, need supportive environments and teachers.

Recommendations

The study results provide a strong argument to continue gathering data based on the current methodology and to implement new studies. To begin, the current study needs to be continued in the same two courses at the same community college for at least two more semesters. The effect size and power of the current study were very small and the results need to be compared against more data. The beliefs found in the Fall 2019 semester may not be representative. The current study using the same protocol and methodology could also be expanded to include more undergraduate agriculture courses taught at the community college by incorporating more theory-based courses such as the introduction to agricultural economics course and more hands-on, applied courses like welding. The effectiveness of mastery experiences might vary by content covered. Expanding the courses evaluated would also allow for more demographic statistics to be gathered, compared, and analyzed. The relationships between variables may only be present in some groups and courses.

As a jumping off point, the current study results provide a solid base to expand upon. When considering new studies, some relatively straight-forward modifications could be made to investigate if timing of the post-test administration influenced SEF mean scores. At the current study site, all students are required to take comprehensive final exams in week sixteen of the regular semester. Future studies could include changing the timing of the post-test administration to a less stressful time in the semester, prior to week fifteen, or to immediately following supplemental exercises. Another modification that could provide additional data to analyze regarding the possible effects of stress, inexperience, and course expectations on SEF beliefs would to be to add a mid-semester administration, for example in week nine, to the current pre-test, post-test schedule. This type of protocol could analyze the possible fluctuations in student self-efficacy beliefs during a semester and compare against events occurring throughout the semester. To have a more accurate evaluation of the supplemental exercises themselves, testing immediately before and after a supplemental exercise could be used. The pre-test could be done prior to a supplemental exercise followed by the post-test assessment immediately after the experience.

New studies should be created using the methodology of the current study but with university student populations. The two courses used in the current study are also taught at universities. The current study results may only represent the beliefs of the community college student population and not the university student population. A study of this type would also allow for more comparison of the community college student and university study populations. It is possible that student population differences are significant and these differences guide their beliefs and actions in higher education. Studies that focus on vicarious experiences and social persuasion effects on self-efficacy should be done to add to the body of knowledge especially as

it relates to female students and those from historically underrepresented groups. Studies that use mixtures of all three (i.e., vicarious, social, and mastery) could be compared with those that use only one type of experience to determine which approaches provide significant differences in student self-efficacy for learning. This information could be valuable as we attempt to build curriculum and support systems for all students.

More work needs to be done to investigate the influence of dual credit on student performance after high school in college. The use of dual credit has grown substantially in Texas over the past twenty years and its impact could play a significant role in student preparedness and student learning beliefs in college. Studies need to be done that investigate the relationships between students' dual credit experience and their current college persistence and performance. Other studies that document the differences in dual credit experiences, evaluate the student performance by experience, and relate those with subsequent student performance in college courses warrant investigation. If the type of dual credit experience influences student performance and success in subsequent college coursework, these relationships should be better identified. Along a similar line, studies that follow students and their learning beliefs across their educational journey should be conducted. The relationship between SEF and course completion need more investigation as well as how SEF for learning could change over time and its relationship to performance across a wider range of courses.

The impact of the college instructor and student learning beliefs definitely needs more research. The influence of the college instructor is critical in the student learning process but more needs to be known about the characteristics of effective instructors and their teaching. Related to instruction and teaching, one particular question to investigate is the relationship between the use of teaching interventions and instructor ability to choose. Does an instructor's

ability to choose a teaching intervention influence their use of the intervention? In the current study, was the instructor's inability to choose their supplemental exercises the reason for the lack of statistically significant difference between treatment and control groups?

The results of the current study revealed that what was believed to be important to student persistence and effort, self-efficacy for learning, might not be as critical as the instructor-student relationship, the classroom environment, and student stress level. This study provided evidence that the instructor does play a significant role in student beliefs about their learning. When considering that relationship and the data on community college student preparedness and persistence, the issues in higher education become heavier. Those students most at risk of failure and disengagement, feel the most anxious about college, and have the most competition for their time and attention are also the ones most effected by the person chosen to lead them through their learning experiences. Community colleges historically use more part-time instructors than universities and community college administrations' concerns typically focus solely on instructor education credentials. These results serve as a call for higher education administrators to value good teaching and to devote more resources towards mentoring inexperienced instructors. It also reveals that the support of students cannot end at the primary and secondary levels. This support must be across the educational matrix.

REFERENCES

Atheron, M. (2017). A comparison of student confidence levels in open access and undergraduate university courses. *Issues in Educational Research, 27*(1), 19-30.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *Educational Psychologist, 37*(2). 122-147.

Bandura, A. (1993). Perceived self-efficacy in cognitive development and functioning. *Educational Psychologist, 28*, 117-148.

Bandura, A. (1997). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*, 191-215.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52,* 1-26.

Bautista, N. U. (2011). Investigating the use of vicarious and mastery experiences in influencing early childhood education majors' self-efficacy beliefs. *Journal of Science Teacher Education, 22,* 333-349.

Briers, G. (2017). [Lecture notes on experimental designs]. Department of Agricultural Leadership, Education, and Communication, Texas A&M University.

Cassidy, S., & Eachus, P. (2002). Developing the computer user self-efficacy (CUSE) scale: Investigating the relationship between computer self-efficacy, gender, and experience with computers. *Journal of Educational Computing Research, 26*(2), 133-153.

Center for Community College Student Engagement. (2019). *A mind at work: Maximizing the relationship between mindset and student success.* https://cccse.org/sites/default/files/Mindset.pdf

Center for Community College Student Engagement. (2016). *Expectations meet reality: The underprepared student and community colleges.* https://cccse.org/sites/default/files/Underprepared_Student.pdf

Chemers, M. M., Hu, L., & Garcia, B. F. (2001). Academic self-efficacy and first-year college student performance and adjustment. *Journal of Educational Psychology, 93*(1), 55-64.

Covington, M. V., & Mueller, K. J. (2001). Intrinsic versus extrinsic motivation: An approach/avoidance reformation. *Educational Psychology Review*, *13*(2), 157–176.

De Castella, K., Byrne, D., & Covington, M. (2013). Unmotivated or motivated to fail: A cross-cultural study of achievement, motivation, fear of failure, and student disengagement. *Journal of Educational Psychology*, *105*(3), 861-830.

Denley, T. & Knox, P. (2016). *Building student success with a co-requisite remediation model and mindset know-how*. https://www.tbr.edu/sites/tbr.edu/files/media/2017/02/Building%20Student%20Success%20with%20Mindset%20Know-How_0.pdf

Dinther, M. V., Dochy, F., & Segers, M. (2011). Factors affecting student self-efficacy in higher education. *Educational Research Review, 6*, 95-108.

Duncan, T. G. & McKeachie, W. J. (2005). The making of the Motivated Strategies for Learning Questionnaire. *Educational Psychologist, 40*(2), 117-128.

Dweck, C. S. (2015, September 22). *Carol Dweck revisits the growth mindset*. Education Week. https://www.edweek.org/ew/articles/2015/09/23/carol-dweck-revisits-the-growth-mindset.html

Dweck, C. S. (2016). *Mindset: The new psychology of success*. Random House Digital, Inc.

Dweck, C. S. & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychology Review, 95*(2), 256-273.

Franko, D. L., Cousineau, T. M., Trant, M., Green, T. C., Rancourt, D., Thompson, D., Ainscough, J., Mintz, L. B., & Ciccazzo, M. (2008). Motivation, self-efficacy, physical activity and nutrition in college students: Randomized controlled trial of an internet-based education program. *Preventive Medicine, 47*, 369–377.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education*. McGraw-Hill.

Graham, S., & Weiner, B. (2012). Motivation: Past, present, and future. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), APA handbooks in psychology®. *APA educational psychology handbook, Vol. 1. Theories, constructs, and critical issues* (pp. 367–397). American Psychological Association. https://doi.org/10.1037/13273-013

Gribbons, B. & Herman, J. (1996). True and quasi-experimental designs. *Practical Assessment, Research, and Evaluation, 5*(14), 1-3.

Harris, C. A., Balkin, R., & Hall, K. (2017). The impact of academic self-efficacy, ethnic identity, gender, and socioeconomic status on academic performance. *Journal of Professional Counseling: Practice, Theory & Research, 44*(2), 2-13. https://doi.org/10.1080/15566382.2017.12069187

Hodges, R. & Hand, C. L. (2005). Teaching in postsecondary institutions: An interview with Dr. Wilbert McKeachie. *Journal of Developmental Education, 28*(3), 20-22.

Huang, C. (2016). Achievement goals and self-efficacy: A meta-analysis. *Educational Research Review, 19,* 119-137.

Juntune, J. (2018). [Lecture exercises in Educational Psychology]. Department of Educational Psychology, Texas A&M University.

Kaynardag, A. Y. (2017) Pedagogy in HE: Does it matter? *Studies in Higher Education*, *44*(1), 111-119. https://doi.org/10.1080/03075079.2017.1340444

Kim, L. E., Dar-Nimrod, I., & MacCann, C. (2018). Teacher personality and teacher effectiveness in secondary school: Personality predicts teacher support and student self-efficacy but not academic achievement. *Journal of Educational Psychology*, *110*(3), 309-323. http://dx.doi.org/10.1037/edu0000217

Knowles, M. S., Holton, E. F, & Swanson, R. A. (2015). *The adult learner: The definitive classic in adult education and human resource development*. Routledge.

Kolesnikova, N.A. (2009). *Community colleges: A route of upward economic mobility.* Federal Reserve Bank of St. Louis. https://www.stlouisfed.org/publications/bridges/fall-2009/the-changing-role-of-community-colleges

Kremer, K. P., Huang, J., Vaughn, M. G., & Maynard, B. R. (2019). College expectations of eighth grade students: The role of learning approaches and parent influences. *Children and Youth Services Review, 104*, 1-9.

Krumrei-Mancuso, E. J., Newton, F. B., Kim, E., & Wilcox, D. (2013). Psychosocial factors predicting first-year college student success. *Journal of College Student Development, 54*(3), 247-266. https://doi.org/10.1353/csd.2013.0034

Linnenbrink, E. A. & Pintrich, P. R. (2002). Motivation as an enabler for academic success. *School Psychology Review, 31*(3), 313-327.

Linnenbrink, E. A. & Pintrich, P. R. (2003). The role of self-efficacy beliefs in student engagement and learning in the classroom. *Reading &Writing Quarterly, 19*, 119-137.

McDonald, D. & Farrell, T. (2012). Out of the mouths of babes: Early college high school students' transformational learning experiences. *Journal of Advanced Academics, 23*(3), 217-248. https://doi.org/10.1177/1932202x12451440

McKeachie, W.J. (2003). William James's talks to teachers (1899) and McKeachie's teaching tips (1999). *Teaching of Psychology, 30*(1), 40-43.

McKeachie, W.J., Pintrich, P.R., Lin, Y.G., & Smith, D. (1986). *Teaching and learning in the college classroom: A review of the research literature*. National Center for Research to Improve Postsecondary Teaching and Learning, The University of Michigan.

Mellow, G. O. (2000, September 4). *New options for higher education in Latin America: Lessons from the community college experience*. [Conference session]. Inter-American Development Bank and the Harvard Graduate School of Education, Cambridge, MA, United States.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education, 7*(2), 133-144.

Orange, C. & Ramalho, E. M. (2013). Reducing the need for postsecondary remediation using self-efficacy to identify underprepared African-American and Hispanic adolescents. *Journal of Research in Educational Psychology, 11*(1), 51-74.

Papinczak, T., Young, L., Groves, M., & Haynes, M. (2008). Effects of a metacognitive intervention on students' approaches to learning and self-efficacy in a first-year medical course. *Advances in Health Sciences Education, 13,* 213-232.

Peaslee, D. (2018). The relationship between faculty confirmation and community college student self-efficacy. *Community College Journal of Research and Practice 42*(10), 636-649. https://doi.org.10.1080/10668926.2017.1333931

Pilling, B. K. & Nasser, D. L. (2015). The early identification of at-risk students in undergraduate marketing metrics course. *Atlantic Marketing Journal, 4*(1), 89-106.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*(4), 667-686.

Pintrich, P. R. (2004). A conceptional framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385-407.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1991). *Motivated Strategies for Learning Questionnaire (MSLQ).* The University of Michigan.

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement, 53,* 801-813.

Putwain, D. W. & Sander, P. (2016). Does the confidence of first-year undergraduate students change over time according to achievement goal profile? *Studies in Higher Education, 41*(2), 381-398. https://dx.doi.org/10.1080/03075079.2014.934803

Ramos-Sanchez, L. & Nichols, L. (2007). Self-efficacy of first generation and non-first-generation college students: The relationship with academic performance and college adjustment. *Journal of College Counseling, 10,* 6-18.

Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 68-78.

Schunk, D. H. (2005). Self-regulated learning: The educational legacy of Paul R. Pintrich. *Educational Psychologist, 40*(2), 85-94.

Shapiro, D., Dunbar, A., Yuan, X., Harrell, A., Wild, J., & Ziskin, M. (2014, July). *Some college. No degree: A national view of students with some college enrollment, but no completion.* National Student Clearinghouse Research Center. https://nscresearchcenter.org/signaturereport7/

Sheu, H., Lent, R. W., Miller, M. J., Penn, L. T., Cusick, M. E., & Truong, N. N. (2018). Sources of self-efficacy and outcome expectations in science, technology, engineering, and mathematics domains: A meta-analysis. *Journal of Vocational Behavior, 109,* 118-136. https://doi.org/10.1016/j.jvb.2018.10.003

Soyer, M. K. & Kirikkanat, B. (2018). Undergraduates' achievement goal orientations, academic self-efficacy and hope as the predictors of their learning approaches. *European Journal of Educational Research, 8*(1), 99-106.

Texas Higher Education Coordinating Board. (2000). *Closing the Gaps: The Texas higher education plan.* http://www.thecb.state.tx.us/DocID/PDF/0379.PDF

Texas Higher Education Coordinating Board. (2015). *60x30*. http://reportcenter.thecb.state.tx.us/agency-publication/miscellaneous/60x30tx-strategic-plan-for-higher-education/

Texas Higher Education Coordinating Board. (2016). *Closing the Gaps final progress report.* http://www.thecb.state.tx.us/DocID/PDF/8138.PDF

Texas Higher Education Coordinating Board. (2019). *60x30 progress report*. http://www.60x30tx.com/media/1518/2019-60x30tx-progress-report.pdf

Thompson, G. H., & Dass, P. (2000). Improving students' self-efficacy in strategic management: The relative impact of cases and simulations. *Simulation & Gaming, 31*(1), 22-41.

Usher, E. L. & Pajares, E. (2008). Sources of self-efficacy in school: Critical review of the literature and future directions. *Review of Educational Research, 78*(4), 751-796. https://doi.org/10.3102/0034654308321456

Wagener, U. (2013). Young children's self-regulated learning: A reflection on Pintrich's model from a microanalytic perspective. *Journal of Cognitive Education and Psychology*, *12*(3), 306-322.

Woolfolk, A. *Educational Psychology* (14th ed.). [VitalSource]. https://bookshelf.vitalsource.com/#/books/9780134774268/

Zeldin, A. L., Britner, S. L., and Pajares, F. (2008). A comparative study of the self-efficacy beliefs of successful men and women in mathematics, science, and technology careers. *Journal of Research in Science Teaching*, *45*(9), 1036-1058.

Zielger, N. & Opdenakker, M. (2018). The development of academic procrastination in first-year secondary education students: The link between metacognitive self-regulation, self-efficacy, and effort regulation. *Learning and Individual Differences, 64*, 71-82. https://doi.org/10.1016/j.lindif.2018.04.009

APPENDIX A

IRB APPROVAL

DIVISION OF RESEARCH

TEXAS A&M UNIVERSITY

EXEMPTION DETERMINATION

(Common Rule –Effective January, 2018)

August 21, 2019

Type of Review:	Submission Response for Initial Review Submission Form
Title:	USING MASTERY EXPERIENCES IN UNDERGRADUATE AGRICULTURE COURSES TO INFLUENCE STUDENT SELF-EFFICACY
Investigator:	Theresa PESL Murphrey
IRB ID:	IRB2019-0888M
Reference Number:	095827
Funding:	None/Internal
Documents Reviewed:	1. IRB Application (Human Research) - (Version 1.1) 2. Information Sheet - (Version 2.1 Approved on 08/21/2019) 3. Esquivel Proposal July 2019 - (Version 1.0) 4. Blinn Signed letter of Support Esquivel Dissertation - (Version 1.0) 5. Esquivel Pretest Posttest instrument - (Version 1.0 Approved on 08/21/2019)
Review Category	Category 1: Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Dear Theresa PESL Murphrey:

The HRPP determined on 08/21/2019 that this research meets the criteria for Exemption in accordance with 45 CFR 46.104.

This determination applies only to the activities described in this IRB submission and does not apply should any changes be made. If changes are made you must immediately contact the IRB.

750 Agronomy Road, Suite 2701
1186 TAMU
College Station, TX 77843-1186

Tel. 979.458.1467 Fax. 979.862.3176
http://rcb.tamu.edu

You may be required to submit a new request to the IRB.

Your exemption is good for three (3) years from the Approval Start Date. Thirty days prior to that time, you will be sent an Administrative Check-In Notice to provide an update on the status of your study.

If you have any questions, please contact the IRB Administrative Office at 1-979-458-4067, toll free at 1-855-795-8636.

Sincerely,
IRB Administration

APPENDIX B

INFORMATION SHEET

Title of Research Study: Using Mastery Experiences in Undergraduate Agriculture Courses to Influence Student Self-Efficacy

Investigators: Dr. Theresa Murphrey and Christi Esquivel

Why am I being asked to take part in this research study?

You are invited to participate in this study because we are trying to learn more about how experiences in the college classroom influence student beliefs about learning.

Why is this research being done?

The survey is designed to record student beliefs about their learning and motivation.

How long will the research last?

It will take about 10 minutes each time to complete the pretest and posttest survey. It will take about 5 minutes to complete the "Understanding Our Students" instrument Total participation in the research will take approximately 25 minutes.

What happens if I say "Yes, I want to be in this research"?

If you decide to participate, please do the following:

To be included in the research, complete the survey when given in your class. The curriculum will be the same for all students regardless of the choice to participate in the research.

What happens if I do not want to be in this research?

The curriculum will be the same for all students regardless of the choice to participate in the research. Your participation in this study is voluntary. You can decide not to participate in this research and it will not be held against you. You can leave the study at any time.

Is there any way being in this study could harm me?

There are no sensitive questions in this survey that should cause discomfort. However, you can skip any question you do not wish to answer, or exit the survey at any point.

IRB NUMBER: IRB2019-0888M
IRB APPROVAL DATE: 10/10/2019

What happens to the information collected for the research?

The results of the research study may be published but no one will be able to identify you.

Who can I talk to?

Please feel free to ask questions regarding this study. You may contact me later if you have additional questions or concerns at

Christi Esquivel
979-209-7512
ch.esquivel@tamu.edu or christi.esquivel@blinn.edu

Dr. Theresa Murphrey
979-458-2749.

You may also contact the Human Research Protection Program at Texas A&M University (which is a group of people who review the research to protect your rights) by phone at 1-979-458-4067, toll free at 1-855-795-8636, or by email at irb@tamu.edu for:

- additional help with any questions about the research
- voicing concerns or complaints about the research
- obtaining answers to questions about your rights as a research participant
- concerns in the event the research staff could not be reached
- the desire to talk to someone other than the research staff

IRB NUMBER: IRB2019-0888M
IRB APPROVAL DATE: 10/10/2019

APPENDIX C

PRE TEST

The following questions ask about your motivation, attitude, learning strategies and study skills for this class. There are no right or wrong answers. Answer the questions for this class as accurately as possible. If you think the statement is **very true of you, choose A.** If a statement is **not at all true of you, choose E**. If the statement is more or less true of you, find the choice between A and E that best describes you.

1. When reading for this course, I make up questions to help focus my reading.
A – Very True of Me
B
C
D
E – Not Very True of Me

2. 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.
A – Very True of Me
B
C
D
E – Not Very True of Me

3. It is my own fault if I don't learn the material in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

4. If I can, I want to get better grades in this class than most of the other students.
A – Very True of Me
B
C
D
E – Not Very True of Me

5. I try to play around with ideas of my own related to what I am learning in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

6. I ask myself questions to make sure I understand the material I have been studying in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

7. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
A – Very True of Me
B
C
D
E – Not Very True of Me

8. When I become confused about something I'm reading for this class, I go back and try to figure it out.
A – Very True of Me
B
C
D
E – Not Very True of Me

9. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.
A – Very True of Me
B
C
D
E – Not Very True of Me

10. I often find that I have been reading for class but don't know what it was all about.
A – Very True of Me
B
C
D
E – Not Very True of Me

11. I'm certain I can understand the most difficult material presented in the readings for this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

12. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
A – Very True of Me
B
C
D
E – Not Very True of Me

13. 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.
A – Very True of Me
B
C
D
E – Not Very True of Me

14. If I don't understand the course material, it is because I didn't try hard enough.
A – Very True of Me
B
C
D
E – Not Very True of Me

15. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

16. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
A – Very True of Me
B
C
D
E – Not Very True of Me

17. During class time I often miss important points because I'm thinking of other things.
A – Very True of Me
B
C
D
E – Not Very True of Me

18. I'm confident I can understand the basic concepts taught in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

19. I'm certain I can master the skills being taught in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

20. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
A – Very True of Me
B
C
D
E – Not Very True of Me

21. I expect to do well in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

22. When I study for this class, I set goals for myself in order to direct my activities in each study period.
A – Very True of Me
B
C
D
E – Not Very True of Me

23. Before I study new course material thoroughly, I often skim it to see how it is organized.
A – Very True of Me
B
C
D
E – Not Very True of Me

24. If course materials are difficult to understand, I change the way I read the material.
A – Very True of Me
B
C
D
E – Not Very True of Me

25. I treat the course material as a starting point and try to develop my own ideas about it.
A – Very True of Me
B
C
D
E – Not Very True of Me

26. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.
A – Very True of Me
B
C
D
E – Not Very True of Me

27. In a class like this, I prefer course material that really challenges me so I can learn new things.
A – Very True of Me
B
C
D
E – Not Very True of Me

28. If I study in appropriate ways, then I will be able to learn the material in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

29. When studying for this course I try to determine which concepts I don't understand well.
A – Very True of Me
B
C
D
E – Not Very True of Me

30. If I try hard enough, then I will understand the course material.
A – Very True of Me
B
C
D
E – Not Very True of Me

31. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
A – Very True of Me
B
C
D
E – Not Very True of Me

32. I believe I will receive an excellent grade in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

33. I'm confident I can do an excellent job on the assignments and tests in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

34. If I get confused taking notes in class, I make sure I sort it out afterwards.
A – Very True of Me
B
C
D
E – Not Very True of Me

35. I'm confident I can understand the most complex material presented by the instructor in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

36. Getting a good grade in this class is the most satisfying thing for me right now.
A – Very True of Me
B
C
D
E – Not Very True of Me

37. I try to change the way I study in order to fit the course requirements and instructor's teaching style.
A – Very True of Me
B
C
D
E – Not Very True of Me

38. Gender
A. Male
B. Female
C. Prefer not to answer

39. College Classification
A. Freshman
B. Sophomore
C. Junior
D. Senior

40. The reason I enrolled in this course was _____.
A. it was listed as an option on my degree plan
B. it is required for my major
C. it is a topic I find interesting
D. it was recommended by a friend
E. it was recommended by an academic advisor

APPENDIX D

UNDERSTANDING OUR STUDENTS QUESTIONNAIRE

Understanding our Students

The following questions ask about your background. There are no right or wrong answers. Any question you feel uncomfortable with, you can skip.

1. Do you hold a job while you are in college?
   A) Yes
   B) No

2. Are you married?
   A) Yes
   B) No

3. Do you have children?
   A) Yes
   B) No

4. How would you describe your background?
   A) Rural
   B) Urban
   C) A little of both

5. Do you feel college is stressful?
   A) Yes, always
   B) Yes, sometimes
   C) No
   D) No opinion

6. Do you consider yourself a first generation college student?
   A) Yes
   B) No
   C) I am not sure

7. Did you always know you would go to college?
   A) Yes
   B) No

8. Were you in the top 20% of your high school graduating class?
   A) Yes
   B) No
   C) I don't know

9. Did you take college classes while enrolled in high school?
   A) Yes
   B) No

10. Were you fearful coming to college?
   A) Yes
   B) No

11. Thinking back to the first college class, how would you characterize that experience?
   A) Very positive
   B) Positive
   C) Neutral
   D) Negative
   E) Very negative

12. Have you participated in group work while in college?
   A) Yes
   B) No

13. Does group work contribute to your learning?
   A) Yes
   B) No
   C) I'm not sure

14. Does group work give you a sense of belonging (or community)?
    A) Yes
    B) No
    C) I'm not sure

15. When working in groups, do you prefer to pick the members of your group?
    A) Yes
    B) No
    C) No opinion

16. Can we contact you regarding your learning experiences? If yes, please provide your name and email on the card provided.

Thank you!

APPENDIX E

POST TEST

The following questions ask about your motivation, attitude, learning strategies and study skills for this class. There are no right or wrong answers. Answer the questions for this class as accurately as possible. If you think the statement is **very true of you, choose A.** If a statement is **not at all true of you, choose E**. If the statement is more or less true of you, find the choice between A and E that best describes you.

1. When reading for this course, I make up questions to help focus my reading.
A – Very True of Me
B
C
D
E – Not Very True of Me

2. 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.
A – Very True of Me
B
C
D
E – Not Very True of Me

3. It is my own fault if I don't learn the material in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

4. If I can, I want to get better grades in this class than most of the other students.
A – Very True of Me
B
C
D
E – Not Very True of Me

5. I try to play around with ideas of my own related to what I am learning in this course.
A – Very True of Me
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D
E – Not Very True of Me

6. I ask myself questions to make sure I understand the material I have been studying in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

7. I often find myself questioning things I hear or read in this course to decide if I find them convincing.
A – Very True of Me
B
C
D
E – Not Very True of Me

8. When I become confused about something I'm reading for this class, I go back and try to figure it out.
A – Very True of Me
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D
E – Not Very True of Me

9. In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.
A – Very True of Me
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D
E – Not Very True of Me

10. I often find that I have been reading for class but don't know what it was all about.
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D
E – Not Very True of Me

11. I'm certain I can understand the most difficult material presented in the readings for this course.
A – Very True of Me
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C
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E – Not Very True of Me

12. I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
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E – Not Very True of Me

13. 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.
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14. If I don't understand the course material, it is because I didn't try hard enough.
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E – Not Very True of Me

15. Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.
A – Very True of Me
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16. The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
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D
E – Not Very True of Me

17. During class time I often miss important points because I'm thinking of other things.
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C
D
E – Not Very True of Me

18. I'm confident I can understand the basic concepts taught in this course.
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C
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19. I'm certain I can master the skills being taught in this class.
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20. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.
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E – Not Very True of Me

21. I expect to do well in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

22. When I study for this class, I set goals for myself in order to direct my activities in each study period.
A – Very True of Me
B
C
D
E – Not Very True of Me

23. Before I study new course material thoroughly, I often skim it to see how it is organized.
A – Very True of Me
B
C
D
E – Not Very True of Me

24. If course materials are difficult to understand, I change the way I read the material.
A – Very True of Me
B
C
D
E – Not Very True of Me

25. I treat the course material as a starting point and try to develop my own ideas about it.
A – Very True of Me
B
C
D
E – Not Very True of Me

26. When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.
A – Very True of Me
B
C
D
E – Not Very True of Me

27. In a class like this, I prefer course material that really challenges me so I can learn new things.
A – Very True of Me
B
C
D
E – Not Very True of Me

28. If I study in appropriate ways, then I will be able to learn the material in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

29. When studying for this course I try to determine which concepts I don't understand well.
A – Very True of Me
B
C
D
E – Not Very True of Me

30. If I try hard enough, then I will understand the course material.
A – Very True of Me
B
C
D
E – Not Very True of Me

31. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.
A – Very True of Me
B
C
D
E – Not Very True of Me

32. I believe I will receive an excellent grade in this class.
A – Very True of Me
B
C
D
E – Not Very True of Me

33. I'm confident I can do an excellent job on the assignments and tests in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

34. If I get confused taking notes in class, I make sure I sort it out afterwards.
A – Very True of Me
B
C
D
E – Not Very True of Me

35. I'm confident I can understand the most complex material presented by the instructor in this course.
A – Very True of Me
B
C
D
E – Not Very True of Me

36. Getting a good grade in this class is the most satisfying thing for me right now.
A – Very True of Me
B
C
D
E – Not Very True of Me

37. I try to change the way I study in order to fit the course requirements and instructor's teaching style.
A – Very True of Me
B
C
D
E – Not Very True of Me

38. I expect to earn a(n) _____ as my final grade in this course for the semester.
A. A
B. B
C. C
D. D
E. I don't know

APPENDIX F

INSTRUMENT CONSTRUCTS

Constructs evaluated		
IGO	Intrinisic Goal Orientation	
EGO	Extrinsic Goal Orientation	
CLB	Control of Learning Beliefs	
SEF	Self-Efficacy for Learning	
CT	Critical Thinking	
MET	Meta-cognitive Self Regulation	
Question Number	Question Number	
Pre/Post Test	MSLQ	CONSTRUCT
1	27	MET
2	6	EGO
3	10	CLB
4	7	EGO
5	24	CT
6	31	MET
7	21	CT
8	28	MET
9	2	IGO
10	33	MET
11	14	SEF
12	8	EGO
13	34	MET
14	12	CLB
15	20	SEF
16	3	IGO
17	26	MET
18	15	SEF
19	19	SEF
20	22	CT
21	18	SEF
22	36	MET
23	30	MET
24	29	MET
25	23	CT
26	4	IGO
27	1	IGO
28	9	CLB
29	35	MET
30	11	CLB
31	25	CT
32	13	SEF
33	17	SEF
34	37	MET
35	16	SEF
36	5	EGO
37	32	MET