BEHAVIORISM VS. CONSTRUCTIVISM:

A COMPARISON OF LABORATORY LEARNING STYLES

by

AUBREY ELIZABETH LOWREY

(Under the Direction of Dennis W. Duncan & Kari K. Turner)

ABSTRACT

This mixed methods study sets out to evaluate learning styles in hands on animal science courses where preparing students to join industry post graduation is a goal of the coursework. Working off of Doolittle and Camp's definition of behaviorism and constructivism, this study was crafted to combine qualitative and quantitative data to determine which learning method created greater gains in student skill performance, confidence, and satisfaction with coursework. Measurements taken were skill performance scores of a basic and advanced skill, student peak heart rate, average horse heart rate, journal responses, surveys, and VARK learner preference analysis. Overall, findings of this study support constructivism as the more beneficial learning style, as Chi Square analysis produced p values indicating a strong positive relationship between learning by constructivism compared to behaviorism for both skills ($p < 0.05$). Additionally, educators can utilize findings of this study to improve course design and better utilize limited resources.

INDEX WORDS: Behaviorism, Constructivism, Animal Science, Equine, Heart Rate, Mixed Method, Self Efficacy

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AUBREY ELIZABETH LOWREY

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AUBREY ELIZABETH LOWREY

Major Professor: Dennis W. Duncan

Committee: Dennis W. Duncan
Kari K. Turner
Nick E. Fuhrman
C. Robert Dove

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
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DEDICATION

I would like to dedicate this thesis to my friends and family who have continuously cheered me on throughout my graduate career. Their countless words of encouragement truly helped me keep moving forward in this process and give me confidence in pursuing my future goals.

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At this time I would like to acknowledge my graduate committee and thank them for all of the hard work they have put forth to help me complete this project. Without their guidance and support this study would not have been possible.

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CHAPTER 1

INTRODUCTION

General Overview/Purpose of the Study

In this study, the learning theories of Behaviorism and Constructivism will be compared i. In three animal science courses during the 2013 spring semester at the University of Georgia with laboratory exercises directly involved with equine handling will be used to illustrate both learning theories. The three courses are identified as ADSC 2000 Animal Practicum, ADSC 2630 Pleasure Horse Management, and ADSC 3630 Horse Production. The first course is an in major requirement of all Animal and Dairy Science students and the remaining two are in major elective courses.

To compare which learning theory created greater gains in student skills, confidence and knowledge retention, the participants' abilities to perform two predetermined skills were assessed using a researcher-developed rubric during three skills. They will be referred to interchangeably as skills test 1 (initial/pre-test), skills test 2 (post practice short term), and skills test 3 (post practice long term). Between the first and second skills test, students will practice one pre-assigned skill of the two possible skills during supervised out of lab opportunities. Assigning a "practice skill" and a "non-practice skill" will serve as a way to test both learning theories simultaneously and under the same conditions. In addition to recording skill scores during the first and second skills test, students and horses were required to wear heart rate monitors (Polar RS300X for the students and Polar S610 for the horses). The comparison of heart rate changes in

addition to survey data and direct observational data were used to indicate student and equine stress during the skills tests, student confidence, and aid in determining the most suitable learning theory for this type of lab activity.

The data collected in this study was used to construct a comparative analysis and illustrate the needs and desires of students. To further interpret this data, participants were placed in learning style groups based on results of the VARK general test (version 7.1). VARK stands for the four learning styles that participants will be placed in to; visual, auditory, reader/writer, and kinesthetic. The inclusion of this additional analysis helps to further examine relationships in the data. Overall the results of this study are useful to faculty as a way to evaluate their own classes and assist in planning of future curriculum while providing justification of allocation of resources for future classes.

Statement of Problem

Today, universities are facing budget cuts and every year, a new demographic of students enters animal science programs. While catering to the educational needs of students, faculty must also be aware of their allocation of resources. To optimize the resources available, this study sets out to examine the importance of hands on animal science courses. To address this problem, the researchers have asked the following questions and in later sections, fine tuned them to specific research questions.

In the laboratory section of animal science courses, is there a difference between learning by Behaviorism versus Constructivism? Furthermore, do these approaches create changes in student confidence and satisfaction with the coursework required of them? Additionally, how can one optimize learning in the non-traditional classroom environment? For this study, a non-traditional classroom environment is one where

information is delivered outside of the formal classroom, traditionally indoor following a written lecture only, and hands on activities are utilized in a large portion of the class as simulation for skills necessary for employment after graduation.

Research Questions and Explanation of Data Evaluation

1. In animal science laboratory courses, is there a difference between learning by the Behaviorism theory versus the Constructivism theory?
2. Does teaching by different learning theories create differences in student confidence changes and satisfaction with the coursework required of them?
3. What is the impact of the horse-human relationship in this setting, i.e. during a simulation of real world activities that may be encountered in an industry type job?
4. Additionally, how can faculty and students optimize learning in the non-traditional classroom environment?

As further explanation of how each research question will be answered in the following sections of this paper, the reader needs to be aware that each research question can be evaluated independently or in conjunction with the other research questions. Each step of the data collection has been designed to answer more than one question. For example, through evaluating skill improvement in a structured skills test where the use of heart rate monitors (on both students and horses) is facilitated, not only were we able to collect student performance data but also measurements of student and horse stress levels in a noninvasive manner. Additionally we tracked confidence changes compared to stress levels during

performance through anecdotal evidence provided by participant journaling. This data was also be used in answering question four (how can one optimize learning in the non-traditional classroom environment?) in addition to skill score improvement, the key source of data to evaluate question one (In animal science laboratory courses, is there a difference between learning by the Behaviorism theory versus the Constructivism theory?). Overall, the combination of all the data collected compared to the outcomes of the VARK learning styles assessment helped to answer the second question (Does teaching by different learning theories create differences in student confidence changes and satisfaction with the coursework required of them?), which is the broadest of all four.

Justification of Study

This study was primarily based upon the definitions set forth in Doolittle and Camp's (1999) first article on Behaviorism and Constructivism learning theory. They stated that behaviorism is a prevalent teaching method in vocational classes and that it may not be the best option for optimized learning, but further investigation was needed. Due to animal science classes being vocational in nature with hands on laboratory sections that focus on the learning of specific skills that are required for employment, the ideas behind Doolittle and Camp's article served as a launching point for this inquiry. Additionally, the ever changing student body and shift from the traditional content based education model originally supported by David Snedden (1914/1915) into a context-content mixed model proposed Roberts and Ball (2009) warranted evaluation of teaching methods in agricultural education in order to better meet the needs of students.

This study is important to the agriculture and animal science community as a starting point to identify the changes that need to occur in the classroom in order to increase enrollment and maintain students in this field. With the current economic climate and change in student demographics, is it important for all departments to identify their student demographic and then teach so that they are producing graduates with a solid knowledge base and practical skills which make them marketable in the ever changing workplace. Through evaluating department programs, faculty can help to ensure the longevity of the department and its' positive reputation.

Limitations of Study

As with any study, limitations were present, even when protocol works to minimize limitations and create a body of work with true academic merit. In the general procedures of this study and the data interpretation, limitations were present and follow as such:

1. The researcher did not affect the outcome of skills tests by assisting students.
2. The researcher did not alter the topics covered in skill demonstration from one class to the other.
3. The researcher did not introduce bias when analyzing or interpreting data.

Assumptions of Study

Though protocol was designed to minimize assumptions, they were present and recognized. On the part of the participants, it was assumed that surveys were filled out honestly, journal entries were completed in a constructive fashion and provided

comments that were useful to data interpretation, and that participants gauged their knowledge and skill levels accurately during survey activities. Assumptions on the part of the researcher were that skills tests were to be graded in the same manner for each student, during each test, and that researchers did not help or hinder student performance or interpret survey and journaling data with bias.

Participant Demographics

Of the 98 students in the three targeting classes, 56 participated in the study (response rate of 57%). Thirty-six of these participants indicated having "equine experience" as defined by the researchers. Forty-one percent reported that they do not ride horses and of those that do ride the three most popular disciplines were western pleasure/horsemanship, hunt seat, and recreational trail, respectively. Just over a quarter of the participants (26.8%) are current horse owners, and roughly one third (36.4%) have owned or leased a horse in the past. Of these owners and leasers, 68.2% cared for the horse on their property. Self-reported equine knowledge displayed in a bell curve with the following percentages: 10.7% know nothing about horses, 23.3% have below average knowledge, 30.4% have average knowledge, 17.9% have above average knowledge, and 17.9% ranked themselves as having excellent equine knowledge. Ages of participants ranged from 18 to 31 with 20 being the most common age. Of the 56 participants, 2 were male. Half of the participants were in their freshman or sophomore year and the other half were in their junior, senior, or fifth year. Forty-seven of the participants were Caucasian, 7 African American, 1 Asian American, and 1 Hispanic.

Equine Demographics

Horses used in this study were from the UGA Horsemanship herd. Horses were mares and geldings of various breeds and ages. Age range was from 4 years to 18. All horses in the herd were selected for student use based upon their quiet demeanor and low reactivity. Both qualities make them suitable for teaching beginner level students.

Definition of Terms

1. Equine experience- being in sole control of a horse, ten or more times, where the horse is not in a stationary position.
2. Mare- female horse
3. Gelding-male castrated horse
4. Halter-harness that is secured on the head of a horse and used to control the horse
5. Lead-line/rope/leash used to direct the horse when used with the halter
6. Pillow-white cotton pad used under a standing wrap in a pillow wrap
7. Standing wrap-thin nylon wrap used to secure pillow
8. HR-heart rate, reported in beats per minute
9. Stall- 10x10 box where horses are individually kept. Stalls used in this study were constructed from wood and metal. Stall fronts were solid wood on the bottom half and metal bars on the top half with sliding doors.
10. Student- any member of the three classes participating in the study
11. Participant- student who voluntarily participated in this study
12. Practice Skill- skill which is assigned to a student or participant as their out of lab practice activity. (Illustrative of Constructivism)

13. Non-Practice Skill- skill which is assigned to a student or participant as their skill to omit from hands on practice and to learn by visual demonstration and studying of printed material. (Illustrative of Behaviorism)
14. Define VARK- Professionally developed instrument used to identify dominant learning style
15. ADSC 2000 Animal Practicum- required course of Animal and Dairy Science (ADSC) students. Covers an overall introduction to farm animal practices and utilizes a laboratory portion where handling of cattle, swine, sheep and horses is taught.
16. ADSC 2630 Pleasure Horse Management- elective course within the ADSC major. Introduction to horse management and the equine industry.
17. ADSC 3630 Horse Production- elective course within the ADSC major. More advanced course where farm management and high level equine care is addressed.
18. Career and Technical Education- education that is both theory and skill based, with emphasis on the skills being necessary for future employment.
19. Heart Rate Monitors- sensors that when placed on opposite sides of the heart measured the electrical charges created by muscular contraction and then translated into heart rate. The sensors for the equine monitor were placed at the midpoint of the ribs along the heartgirth and behind the elbow. The sensors for the human monitor were located on one plastic and elastic band that was placed around the chest at the base of the pectoral muscle. To increase efficiency of sensors, aloe vera gel was applied to the sensors before applying to the skin. (Sensors were unable to measure heart rate through clothing layers). Two models

of heart rate monitors were used: Polar RS300X was used for the students and Polar S610 for the horses.

CHAPTER 2

LITERATURE REVIEW

Introduction

When compiling this review of the literature, it was found that there is a lack of research directly related to the proposed questions: "is there a difference between teaching by constructivism or behaviorism and what measures need to be taken to address the needs of the changing demographic of animal science students?" In designing this study a mixed methods approach was taken, borrowing aspects of multiple areas of research to design a unique exploratory study. Due to this, the following review will focus heavily on the original theories that were used in development of this project and in explaining the biological processes that are measured during data collection. The review will begin with the addressing of core theories, followed by addressing additional areas of the literature referenced and then concluding with examples of studies similar in topic, but least closely related of the referenced work and shared only to display the current direction of research.

Theoretical Framework and Previous Research

I. Constructivism and Behaviorism

In this study, the bulk of the theoretical framework will focus on the definitions of Behaviorism and Constructivism as separate learning theories made popular in academia by Doolittle and Camp (1999). Doolittle and Camp introduce their interpretation of and

support for the theory of Constructivism in their original research. They report data that supports constructivism as a better method of learning for vocational (also known as career and technical education) as compared to the more prominent method of behaviorism learning. By Camp and Doolittle's (1999) definition behaviorism is "learning as the acquisition of stimulus-response pairs" (pg. 2). What this equates to in the classroom is the mastering of a skill that is taught by the instructor and then mimicked by the student without the student taking information on the skill in and processing it so that it may then be applied to real life situations over a length of time. In comparison, constructivism "learning as the processing of information" (Doolittle & Camp, 1999, pg. 2) is taking the taught skill and though still asking the student to demonstrate mastery, the student is first allowed to master the skill in their own way, which provides ownership to the material and longer retention of information. The difference between the two learning styles is captured by this quote, "Following that logic, it seems clear that a curriculum designed to provide specific, pre-determined skills demonstrated to industry standards does not represent knowledge constructed internally by the student, but rather knowledge and skills externally imposed on the student" (Doolittle & Camp, 1999, pg. 7).

Roberts and Ball (2009) summarize the history of the development of agricultural education in America sharing that in 1914 and 1915 two predominant educators voiced their view of how agriculture should be taught. David Snedden and John Dewey both proposed differing teaching styles for agricultural education, Dewey supported what aligns with constructivism and Snedden supported a behaviorsm approach that was accepted by legislation writers and adopted as the accepted teaching style for vocational

courses. "Snedden supported content-centered curricula focused on specific skill acquisition, based on established industry standards, and delivered separate from academic content" (pg 81). This proposed model won out and is the traditional model for teaching agriculture. It also, aligns well with the goals and methods of Behaviorism. Dewey on the other hand supported a context-based model that aligns well with Constructivism. Following the summary of history presented by Roberts and Ball (2009), the researchers concluded that, "there are theoretical bases for viewing agriculture both as content and context for teaching agriculture at the secondary level" (pg. 81). They further explained this conclusion for current teaching methods by visually illustrating a combined content-context model based upon renderings of each separate model in previous sections of their article. (All three models are displayed below)

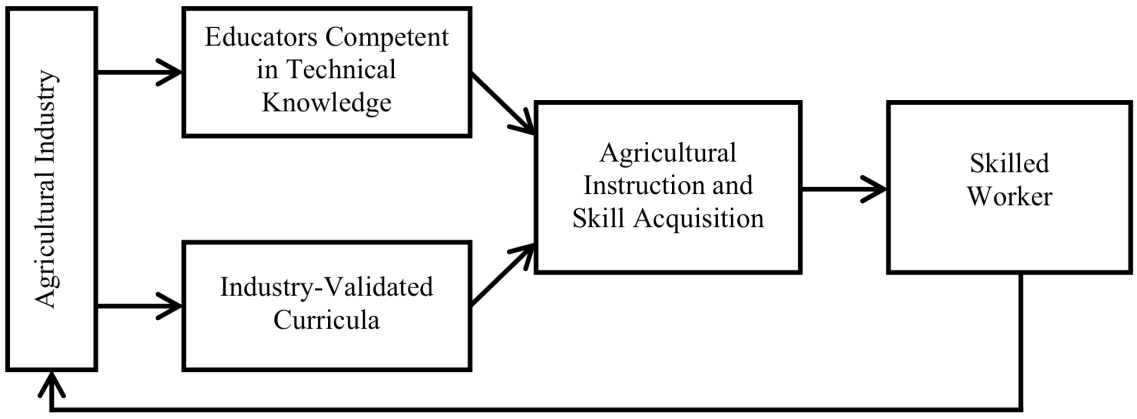

Fig 2.1 Content based teaching model (Roberts & Ball, 2009)

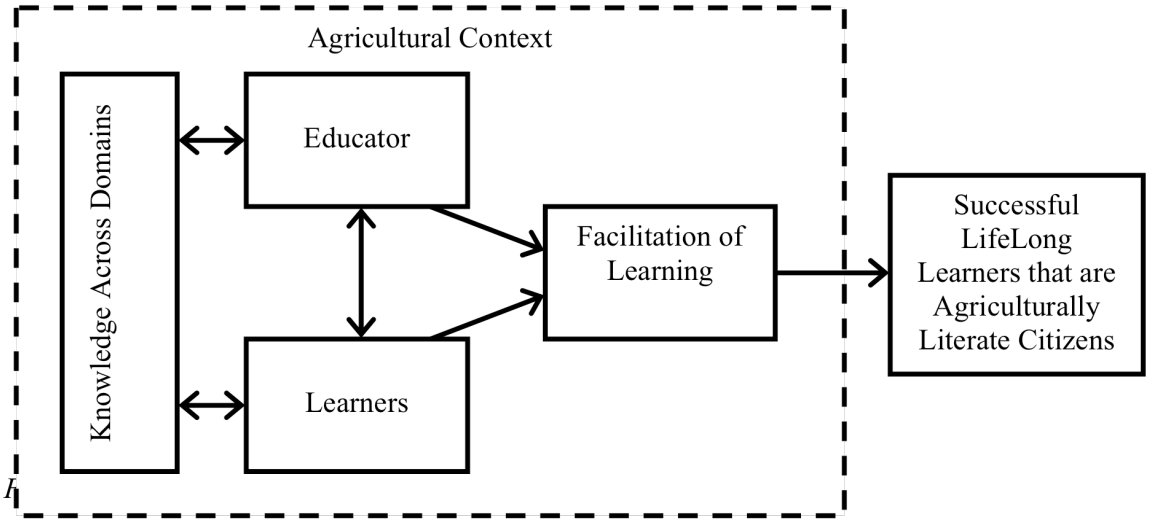

Fig 2.2 Context based teaching model (Roberts & Ball, 2009)

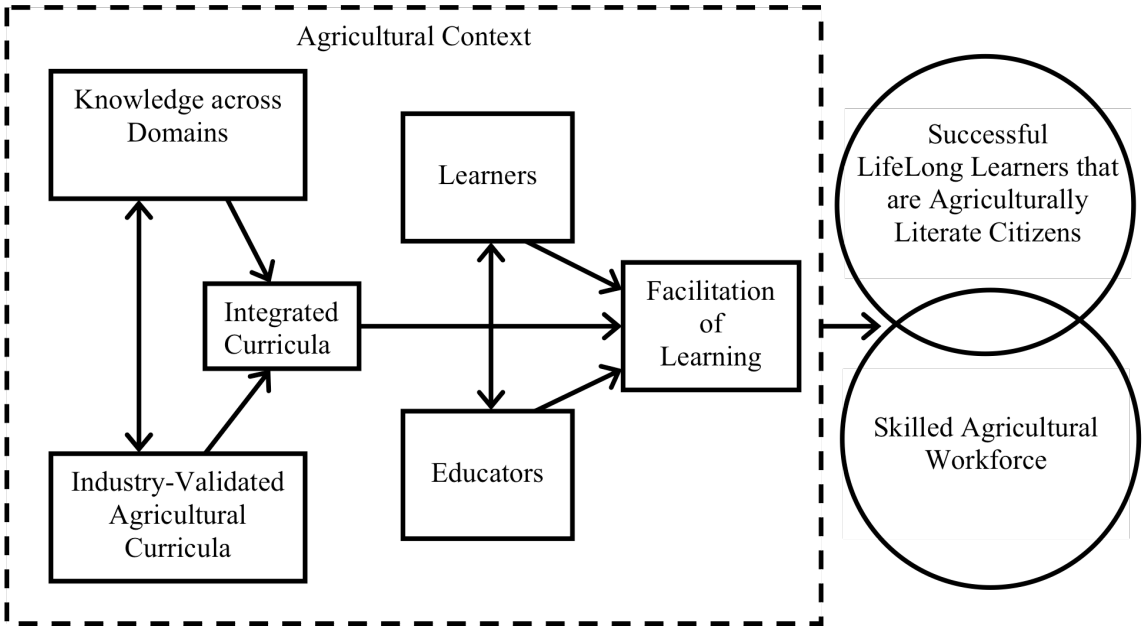

Fig 2.3 Combination of Content and Context Models (Roberts & Ball, 2009)

Though research has been published stating that there is still a place for both Behaviorism and Constructivism in agricultural education, there is always room to re-test

and compare results. It is through this study that studies will be applied and evaluated through both qualitative and quantitative data to determine the suitability of each theory.

II. Self-Efficacy

Diving further into the theoretical framework of this study, self-efficacy theory plays a major role. According to Bandura and Adams (1977), Self-efficacy Theory is intertwined with the theory of behavioral change in a way that further explains the importance of building student confidence in classes in efforts to improve knowledge and skill gains. Perceived self-efficacy directly influences the size of a goal that a person is willing to set. When a person has high self-efficacy they are more prone to expend greater effort in tack completion and achieving goals but the person who has low self-efficacy will not strive for as great of an achievement. (Bandura & Adams, 1977).

Bandura first introduced the theory of self-efficacy in 1977 and it is still explored and evaluated to this day. In *Learning Theories: An Educational Perspective* by Dale H. Schunk (Third Edition) Bandura's definition of self-efficacy is written as "Self-efficacy refers to personal beliefs about one's capabilities to learn or perform actions at designated levels" (Bandura, 1977a, 1977b, 1986, 1993, 1997 as cited by Schunk, 2000).

What this means for this study is that success of either learning theory (behaviorism and constructivism) may be impacted by the self-efficacy of students in the classroom. This researcher's interpretation of Bandura's theory is that if students are not comfortable, they will be stressed and lack confidence in themselves in regards to the course material. When confidence is lacking, goals will be limited as will the possibility for mastering the course material. This then creates an added responsibility of the

instructor to ensure that the course material is not only stimulating, but that the learning environment promotes open inquiry and trust with the students. This unique relationship is the source for the inclusion of measuring heart rate and student confidence changes alongside the raw performance data from each learning theory (to be further described in Chapter 3).

III (a). Horse-Human Interactions

The relationship between humans and large animals has been studied in an effort to improve handling procedures in ways that reduce stress and improve safety as handlers can be a source of stress in livestock animals. Temple Grandin is one of the most highly known researchers in the subject of animal handling and her findings have helped to explain the behavior patterns of large animals in respect to their interactions with humans. As a child, Granin was diagnosed with autism, and through the affects of this disorder, she has an innate ability to understand animals and their reactions to their surroundings. From this, she has been able to achieve a deeper understanding of low stress animal handling and through her research has been able to revolutionize animal husbandry.

When reviewing Grandin's work, two statements summarize the purpose of her work and provide relevance to both production and teaching systems where teaching animals are involved. "Handlers who understand livestock behavior can reduce stress …Animals which have had frequent gentle contact with people will be less stressed during handling than animals which have had previous aversive treatment" (Grandin, 1989, para. 1). The importance of reduced stress in livestock is a two-fold benefit,

providing safety for both the animal and the handler. Horses (grouped in the livestock category) are highly reactive animals and do pose a potential health hazard to all those who come into contact with them. But by fostering correct handling and making efforts to reduce stress, risk of injury can also be reduced.

Of Grandin's research into livestock practices, her explanation of the flight zone, a commonly used practice in teaching livestock handling is the personal space of an animal. "Understanding of flight zone can reduce stress and help prevent accidents to handlers" (Grandin, 1989, para. 18). An understanding of flight zone is key to the fundamentals of effective animal husbandry.

The principles of the flight zone are based upon animal behavior and anatomy. Horses are primarily binocular in vision and due to their prey animal instincts they have a relatively large flight zone. These traits combined create a reactive animal that can become stressed when a threat enters their flight zone and will act accordingly. The purpose of the handling laboratories in the targeted classes in this study is to educate students so that they can become capable handlers of animals.

A Keeling, Jonare, and Lanneborn (2009) help to understand the horse-human interaction with a study design very similar to this study. In their study, horses and handlers heart rates were monitored and it was determined that a horse's stress level can be influenced by the stress level of their rider when the rider anticipates a stressful event. The design of the study is quite similar as handlers and riders were at the amateur level.

> "The 27 horses and 37 riders in this study were varied, but typical of hobby riders and horses in Sweden. The people taking part had at least 3 years experience of riding, but none were professional or competed at high levels. The horses were of different breeds and ages and were managed according to standard husbandry procedures. In the first part of the study participants led the horses. There were 19 females and one male, and all except four were students at an agricultural college.

> The horses comprised seven mares and three geldings owned by the agricultural college. Each horse was led by one of two people on each of two test days. The second part of the study observed people riding. There were 16 females and one male; of these, 15 took lessons at the riding school and the other two were employed there. The horses in this case comprised seven mares and 10 geldings owned by the riding school. Every horse–rider pair was observed once." (Keeling, et al., 2009, pg 70).

Results of this study showed that both horses and humans had increases in heart rate during the third phase of the experiment. (Handlers were told that on the third pass of the researchers an umbrella would be opened but it was in fact not opened.) Statistical evaluation of the heart rate measures were present and researchers found their results to indicate that side by side measure of heart rate in horses and handlers is a suitable measure of stress caused by the horse-human interaction. (Keeling, et al., 2009).

A second similar study was conducted by König von Borstel et. al. in 2011. In this study sixty-five horses were tested for behavior and heart rate changes in three situations: turnout, riding, and leading. From this study the researchers found that handlers have an impact on horse behavior and heart rate variability but not on the horses' actual heart rate. The impact of the handlers was capable of masking the horses' responses to the stimuli that was introduced but not completely neutralize it (König von Borstel et. al, 2011).

III (b). Heart Rate as a Non-Invasive Measure of Stress

Through studying exercise physiology in horses, the circulation of hormones such as adrenaline has been linked to the cardiovascular response to exercise. In fact, the physiological responses to stress are the same as those to the "flight or fight" responses brought about by the sympathetic nervous system (Marlin & Nankervis, 2002).

In exercise multiple changes are occurring to the horse, some can be visually observed and others reside within the animal. Of the less invasive measures of the exercise response measures of heart rate and respiration are common. For this study we measure heart rate as an indicator of stress as symptoms are parallel. Before diving into the literature of similar studies it is important to understand the sympathetic nervous system response to the "fight or flight" instinct. The sympathetic division of the nervous system stems from the autonomic nervous system, which is responsible for involuntary responses.

> "The sympathetic division of the autonomic nervous system allows that body to respond to emergency situation resulting from sudden changes in the internal or external environment. It mediates an increase in alertness, heart rate, blood pressure, metabolism, respiration rate, sweating, piloerection, and mobilization of energy within the body. Simultaneously, it decreases activity of the digestive, urinary, and immune systems. It causes an increase in blood flow to the visceral organs. In other words, the sympathetic nervous system activates those systems an animal needs in order to fight while inhibiting those systems not needed for fighting" (Akers & Denbow, 2008, pg 265).

In a study by Mohr, Langbein, and Nurnberg (2002), heart rate was determined to be an acceptable non-invasive measure of stress in calves and cows. In the discussion portion of this article, the authors state, "heart rate (HR) is another suitable parameter for studying animal responses to physiological or environmental challenges and to judge the level of stress load on the animals. HR measurements enable assessment of short-term effects on animals, but gives little information about the long-term effects of stress (Mohr et. Al., 2002).

In the two studies discussed in the prior section, heart rate was established as a non-invasive measure of stress suitable for the short-term situation of a skills test. Due to the nature of the study looking at a short time of interaction between students and horses,

it is important to find the most non-invasive yet descriptive way to measure physiological changes in horse.

IV. VARK

The VARK test is an assessment used to place people into one (or more) of four learner categories; visual, aural, read/write and kinesthetic. By determining which learning style you align with, learning and communication skill can be improved. The VARK test has been used in multiple studies and has been tested for validity by researchers outside of the developing organization. The most recent validity and reliability check was completed by Leite, Syinicki, and Shi in 2010. Their findings are shared below, but overall it was determined that the VARK analysis is adequate, as long as it is not used as a determining factor for high stakes decisions.

"Validity: The authors examined the dimensionality of the VARK learning styles inventory. The VARK measures four perceptual preferences: visual (V), aural (A), read/write (R), and kinesthetic (K). VARK questions can be viewed as testlets because respondents can select multiple items within a question. The correlations between items within testlets are a type of method effect. Four multi-trait-multi-method confirmatory factor analysis models were compared to evaluate the dimensionality of the VARK. The correlated trait-correlated method model had the best fit to the VARK scores. The estimated reliability coefficients were adequate. The study found preliminary support for the validity of the VARK scores. Potential problems related to item wording and the scale's scoring algorithm were identified, and cautions with respect to using the VARK with research were raised." (Leite et. al, 2010)

Reliability: "They also explain that Cronbach's alpha would underestimate the reliability of the VARK scores, because Cronbach's alpha assumes that all items are parallel measures of the construct, which is not true with the VARK. Therefore, they provide estimates of reliability based on confirmatory factor analysis. The reliability estimates for the scores of the VARK subscales were .85, .82, .84, and .77 for the visual, aural, read/write, and kinesthetic subscales, respectively, which are considered adequate given that the VARK is not used for high-stakes decisions." (Leite et al, 2010)

V. Previous Related Studies

Anecdotal Evidence in the Classroom

When creating this study, existing methods were modified. Due to this, an interdisciplinary approach is taken to combine aspects of multiple past studies in order to create a study that evaluates the topic at hand in multiple ways.

Jack and Eversole (1997) report a class, Livestock Merchandising offered at Virginia Polytechnic Institute and State University. Their findings are useful as it discusses how the course is designed to provide students an insight to the process of selling livestock at a self-run auction. Two quotes that illustrate this are Gunn (1983) as cited in Jack and Eversole, (1997) who surveyed agricultural businessmen. They indicated that … "agricultural business graduates usually have a strong technical knowledge level but are poorly prepared in the areas of oral presentation and writing, team management and participation, media and general public relations, and application of knowledge to practical aspects of agriculture" (Jack & Eversole, 1997, pp.37) and "practical learning experience topped the list of educational and experiential needs of employers" (Jack & Eversole, 1997, pp.37). Both statements share the importance of students to be able to apply knowledge in a real world situation, as it is a concern of employers in the industry. These points apply to the comparison of behaviorism to constructivism as they illustrate the desired endpoint of each learning theory. In this study we will investigate which theory increases learning.

Another study that illustrates the importance of this investigation is *Undergraduate Horse Industry Tour Enhances Experiental Learning*, written by K. Anderson of the University of Nebraska. Anderson reports, "Students in colleges of

agriculture have shifted from primarily rural backgrounds to students coming from urban and suburban backgrounds" (Anderson, 2009, pp.18). With a large demographic change, curriculum and teaching methods need to adapt to meet the new challenges of educating students so that upon graduation they are good reflections of the university and are competitive in today's job market. If students are not coming into programs possessing technical skills and well-developed practical application, then it is the job of the university to utilize the learning theories, which foster the development of these skills.

Student Satisfaction with Education Programs

Adjusting curriculum to fit the needs to the demographic shift in agricultural classes, many universities have collected data on student satisfaction with courses, retention of information, and curriculum needs. One study by Denniston and Russell of Colorado State University (CSU) was sent out to alumni and asked about satisfaction with their degree. From the study they found that 56% of respondents have careers directly relating to the equine industry and 84% of respondents were either satisfied or very satisfied with their education. From the data in this study, CSU has changed their curriculum to benefit both groups of students' post-graduation. (Denniston & Russell, 2007)

Southern Utah University did a similar study, with the main difference being the respondent pool. For this study they surveyed current undergraduate students to gauge satisfaction with the program and identify which skills the students feel they gain the most improvement in. A key finding in the study was that the equine classes were offering new knowledge and skill improvement.

> *"Students also agreed they developed new skills through participating in the equine courses (Table 4). Of the statements related to skills, they expressed their strongest agreement (P<0.01) with the statement referring to developing physical skills" (Wood, Gasser, & Winward, 2010, p.18).*

This finding shows a turning point in the college education system. The realization of a demographic change and needs for curriculum modifications are needed in order to foster student development in the best way possible and ensure that students are learning at the highest level of their capabilities.

Elliott and Shin are referenced in the introduction section of the study by Southern Utah University, with a statement that adds the previous statement by looking at the situation from a different angle: student retention. "Understanding what keeps students satisfied improves retention rates and creates a more sustainable campus environment (Elliott & Shin, 2002)" (Wood, Gasser & Winward, 2010, pp. 17)

A study by Long and Morgan, published in 2010 also addresses course curriculum. Long and Morgan developed a Delpi study that asked faculty for their level of agreement with specific statements pertaining to curriculum in a two year equine program. Long and Morgan (2010) found that high levels of agreement correlated with preparing students to compete for industry jobs, developing skills with hands on experiences, produce students with a high level of equine management, and including courses such as equine health, internship, conformation, nutrition, and anatomy.

Another side to the evaluation of curriculum is the investigation of course material on students with agricultural backgrounds. Pratt-Phillips and Schmitt, (2010) completed a study in 2010 that identified if there is a correlation between previous equine experience with grade performance and required effort.

> *"…there was no significant relationship between a student's previous equine experience and their performance in the class…there was a significant negative relationship between previous experience and perceived effort…but no relationship between effort and final grade" (Pratt-Phillips & Schmitt, 2010, pp.42)*

These findings will allow for the researchers to find more insight with their own data as the sample population is of ranging backgrounds and equine skill level. It is because of this that when designing the study, both an advanced and novice skill were taught to the participants in order to create the ability to look at participant improvement more thoroughly. Not only will the students be sharing their own perception of their ability to improve on the skill, but they will also be demonstrating their ability to perform the skill and commenting on the experience through written feedback.

Summary and Uses of the Literature Review

Through analysis of the literature it can be established that there is a lack of research in the specific area of this study. Despite the lack of research there are solid fundamentals established which can be used to lay the groundwork for this study. By working from the theoretical backbone of agricultural education and a solid understanding of Behaviorism and Constructivism combined with an understanding of the physiological symptoms of stress, an experiment can be designed that crosses boarders and links multiple fields together. In addition, findings of this study can further explain the current research on student satisfaction with college programs as this study is

finding information on student satisfaction at the present time of the course as compared to studies conducted after completion of the course or graduation.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this study was to carry out an experiment that evaluated student proficiency in a physical skill involving a live horse. The learning theories to be compared are behaviorism and constructivism. The goal was to determine which type of learning theory is most effective in a lab based class where an end goal for students is to be prepared to join industry for their career post-graduation. Participants were broken into two groups, with the difference between the goups being the type of skills practice they will partake in during the time between initial and final testing for a given skill. In addition demographic information were recorded, with only previous equine experience being used to pre-sort students prior to randomly assigning students to a practice group. This was done to create an even distribution of students based upon their self selected skill level in each group. The demographics that were recorded were age, gender, academic year, previous equine experience and equine courses taken in previous semesters or or those that they were currently enrolled in.

The measurements taken throughout skills tests were skill score, heart rate of participant, heart rate of horse, time taken to complete the test and participant responses collected from surveys and journaling activities allowing reflection on out of lab practice. Heart rate measurements were recorded on a beats per minute (BPM) basis. Measurements taken in the testing situation were compared to survey results from

participants documenting self-efficacy in relation to preparedness for the skills test and confidence in being able to fully perform the skill. Heart rate was used to evaluate stress/anxiety of student participants and if the students' stress level has an impact on their equine partners' stress level.

Hypotheses

H1: If students are allowed to practice a set skill outside of class, they will then earn a higher score in a test scenario where skills performance is evaluated. H2: If students are more prepared for the test and have associated improvement of skills with the animal they will be using in the testing scenario, then there will be a decrease in heart rate of the participant (as a way to measure reduced test anxiety or student stress) and a decrease in the heart rate of the horse (in result of students confidence in the situation and reducing stress in the animal by being comfortable with the skill and being graded on performance).

Objectives of the Study

- Objective 1: Describe the demographic characteristics of study participants.
- Objective 2: Determine which form of instruction creates better learning for participants in terms of skill improvement, test performance, and confidence.
- Objective 3: Determine self-efficacy of participants during different stages of learning and compare to anxiety levels as indicated by heart rate for both behaviorism and constructivism illustrative groups.

- Objective 4: Determine the impact of participant anxiety on lab animals' anxiety levels.
- Objective 5: Determine if learning styles influence learning outcomes in the behaviorism and constructivism test groups.

How Objectives were Measured

Objective 1: Comparison of both learning processes to each other was done by way of a pre-test/post-test skills performance test model. The students were divided into groups and all received the same lecture materials and demonstration of the pre-determined skills. All students were allowed to practice the skill in lab but the students representing the behaviorism group were only be allowed to practice for the skills test by reviewing lecture material. The group that represented constructivism was required to practice the skill using lab materials (university horses used in lab) during set times outside of class period. The researcher acted only as supervisor for guidance and safety and students were encouraged to process materials related to the skill individually and/or with help from peers. During out of lab practice, researchers were allowed to answer questions from students on their assigned skill, but during skills testing no help was allowed from the researchers.

Objective 2: The way in which the researcher charted the correlations between self-efficacy, test anxiety/stress, and performance scores was to compare data gathered before, during, and after skills testing. Self-reporting surveys indicating comfort with skills, test situations, and student preparedness, as measures of changes in student self

efficacy, were compared to numerical skills scores and changes in heart rate, as an indicator of stress, on a BPM basis during testing situations.

Objective 3: To assess the effect of student stress on their equine partner in the skills test situation, heart rate changes were charted and compared. The researcher used student and equine heart rate measurements to correlate if changes in one possibly created changes in the other. In addition equine heart rates were examined over time during a single skills test day to examine if there was a change in comfort for the horse as different students interacted with it.

Objective 4: To measure objective four, VARK results will be compared to skills test outcomes and participant journal entries. This evaluation tool determined the more favored learning style of students and was then compared with improvement in either the behaviorism or constructivism skill.

Objective 5; The researcher collected baseline demographic data on all participants. This data was used to explore the current student population in animal science courses with an equine component at the University of Georgia to assist with generalizing the results to a larger population of students.

Reduction of External Influence and Validity of Instruments and Methods

During skills testing two researchers were in charge of data collection, one for grading skill performance and the other for collecting heart rate data and timing skills. Throughout the study, the researchers in charge of each job during skills tests stayed with that job from test to test to reduce any differences in the data that may have been created by changing the scorer or management of the heart rate monitors. In addition, skills tests

and external practices were held in the same location, the horse barn and surrounding paddock space. The barn had three identical stalls, 10 ft by 10 ft with solid side walls and half solid, half metal bar front and back sides.

To further reduce the impact of outside factors on student performance, directions and rubrics for each skill in addition to an assignment sheet for journaling were presented to students at the beginning of the project. Each handout had verbal directions accompanied by pictures for both skills and all materials were accessible via an online database used by UGA for course materials after being evaluated by a panel of experts which make up the committee for this masters project. All handouts and rubrics can be view in the appendix section.

Each of the surveys were also individually developed for this study as it is the first study of this nature to be attempted. Five surveys were created, each to be administered at set time points in the study. Each survey was reviewed by the expert panel mentioned in the paragraph above. Face validity of each survey was established by following the suggestions of Dillard. Surveys can be viewed in the appendix section.

Participant Selection

The participants were self-selecting as the targeted population was students registered in three courses offered for the spring 2013 semester. The three courses were ADSC 2000 (Practicum), ADSC 2630 (Pleasure Horse Management), and ADSC 3630 (Horse Production). These courses were selected as they provided access to a diverse population of students and all had some component of an equine skills lab. Once the course had begun, students were offered the opportunity to volunteer for participation in

the study. Afterwards, students were sorted by perceived ability level and placed into practice groups by random selection. The overall reason for working with this population is due to the ease of contact and ability to facilitate the study with all participants in identical processes as both skills in this study were part of the courses designated skills to learn and all equine portions of the sampled courses were taught by the same professor.

Timeline/Sequence of Events

The total time frame of the experiment did not exceed one semester with the expected duration of participation in research activities not exceeding 4 hours total per each participant (Figure 1). The study operated in two parts, the first operating when students are aware that they will be tested on skills and are provided with instruction and two weeks of preparation time. The second phase was an unannounced skills test at the end of the semester. This breakdown of the study helps to account for a true test of participant retention of skills and knowledge. All students participated in learning skills A and B as part of course requirements and participated in skills tests and practice session. Participants were asked to wear a heart rate monitor during the announced skills tests and complete five surveys.

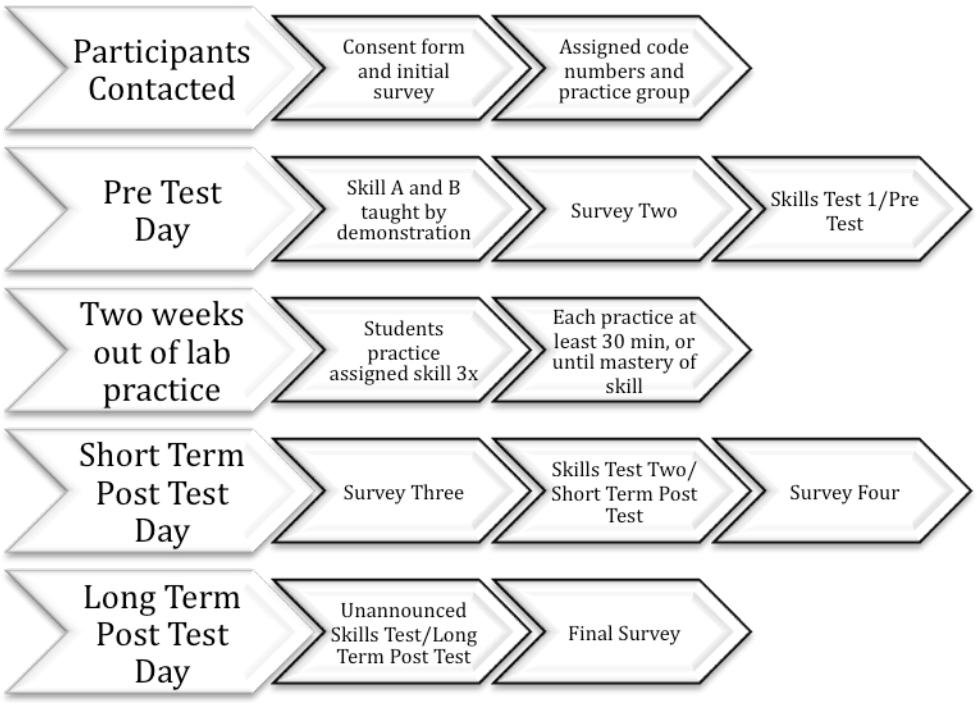

Figure 3.1 Visual Representation of Timeline for Data Collection

Procedures

Contact 1: On the first day of contact with research participants, the study was verbally explained as was the consent form that they were presented. Attached to the consent form was the VARK questionnaire and the initial survey. When explaining the concept of the study the researcher was careful to make sure that students knew that participation in the study was voluntary but that all students would be participating as small portion of their course grade (<5%) only their results would not be recorded, only their participation. Students were then presented with approximately 20 minutes to complete the consent form, VARK instrument and the initial survey.

After completion the survey packets were collected by the researcher who then sorted student based upon their self-reported equine knowledge. Students were assigned a code number and using the equine knowledge rating to ensure equal representation,

students were sorted into one of two practice groups (Black or Red) by use of a random number generator in Excel.

Contact 2: In the lab period following the initial contact day, students are given a card with their code number and practice group marked. Following this one researcher (same researcher for each lab) demonstrates both of the skills being tested in the study and another researcher (who is in charge of heart rate monitors for the duration of the study) demonstrates how to attach the monitor and explains the rationale behind using aloe vera to increase sensitivity of the sensor.

Immediately following the demonstrations, the second survey is administered. Once the second survey is completed students are asked to line up in the center aisle of the barn and wait to begin the first skills test (pre-test). One at a time students put on the heart rate monitor, around their ribcage under the pectoral muscles. Once measurement of a heart rate is established the student enters the stall where the research horse (horses rotated for between labs but stayed the same for each class) and two researchers (one for scoring, one for recording heart rate) were waiting. Stalls were 10 ft by 10 ft with solid walls and half solid, half metal bars front and back walls. When the student was ready they performed skill A (basic skill: haltering) and then followed with skill B (advanced skill: wrapping). Timing and monitoring of heart rate was stopped in between skills. Once both skills were completed the student left the stall and removed the heart rate monitor. Each student followed the same protocol when completing skills A and B. For each student, researchers made it clear that they could not help students by answering questions and that if the student wanted to discontinue pursuit of skill completion that

they could stop at any time. After completing the initial skills test, students were able to practice both skills as part of lab.

Contact 3 a,b, and c: Following the skills test students were required to come to the lab facility and practice their assigned skill three times for thirty minutes each, or until they could demonstrate mastery of the skill for that day at the barn. Two weeks of "barn hours" were set aside for each class. Researchers had horses ready at the barn when hours began and each student was asked to practice with the same horse they completed the skills test with. In the event that their horse was not available they could practice with another member of the horsemanship herd. In this setting, students were able to ask the researchers questions on skills but were encouraged to work with their peers and construct their own knowledge pathways. In addition to the three practices, students were asked to complete journal entries to reflect on their time at barn hours. The directions for journal entries can be found in the appendix. All journals were to be typed and turned in at the start of the lab where skills test two was completed.

Contact 4: Once the out of lab practice is complete, in the next lab period survey three was administered. After completion of survey three students completed the second skills test (short term post-test) in the same manner as described for skills test one. Once the second skills test was completed students were given survey four to complete. At this point in the study, the students think that the study is complete.

Contact 5: At the end of the semester an unannounced skills test three (long term post-test) is conducted. Students complete this skills test in the same manner as tests one and two with the exception of the use of a heart rate monitor. Heart rate monitors were not used for the sake of time. Additionally, an alternative rubric which scored based upon N-, N+, Y- or Y+ representative of their degree of ability to attempt the skill and complete correctly was used which can be viewed in the appendix. Once skills test three is completed students were given survey five to **complete.**

Breakdown of Participant Groups

Participants were placed into two practice groups by random sort via a random number generator tool in Excel after first being sorted by self reported equine knowledge and assigned a numerical code. Each participant was placed in one of two groups, "Black" or "Red"

- Black = Participants who practice skill A (haltering) during out of lab practice. In this scenario participants will learn skill A by Constructivism, and skill B by Behaviorism.
- Red = Participants who practice skill B (pillow wrap) during out of lab practice. In this scenario participants will learn skill A by Behaviorism, and skill B by Constructivism.

*Horse experience will be viewed as a student with 10 or more interactions with horses where the individual is *in sole control* of the horse where the horse was not in a stationary position*

*Students will not be told which group they are in, instead they will be identified by a color; red, black, white, silver. *

Materials

- Equine heart rate monitors (Polar S610)
- Human heart rate monitors (Polar RS300X)
- Horses used for skills test
- Box stalls
- Timers
- Halters and lead lines
- Standing wraps
- Pillow wraps

Data Analysis

Data analysis was completed using statistical calculations by SPSS for quantitative data and domain analysis for qualitative data. Calculations used for quantitative data were frequency, T-test(s), and Chi-Square. In the following chapter data is presented in addition to the appropriate statistical calculation.

CHAPTER 4

DATA AND RESULTS

Objective 1: Demographics

Participant Demographics

Of the 98 students in the three targeting classes, 56 participated in the study (response rate of 57%). Thirty-six (36%) of these participants indicated having "equine experience" as defined by the researchers (see definition of terms). Forty-one percent (n = 56) reported that they do not ride horses and of those that do ride the three most popular disciplines were western pleasure/horsemanship, hunt seat, and recreational trail, respectively. Just over a quarter of the participants (26.8%, n= 56) are current horse owners, and roughly one third (36.4%) have owned or leased a horse in the past. Of these owners and leasers, 68.2% cared for the horse on their property. Self-reported equine knowledge displayed in a bell curve with the following percentages; 10.7% know nothing about horses, 23.3% have below average knowledge, 30.4% have average knowledge, 17.9% have above average knowledge, and 17.9% ranked themselves as having excellent equine knowledge. Ages of participants ranged from 18 to 31 with 20 being the most common age. Of the 56 participants, two were male. Half of the participants were in their freshman or sophomore year and the other half were in their junior, senior, or fifth year. Forty-seven of the participants were Caucasian, 7 African American, 1 Asian American, and 1 Hispanic.

Equine Demographics

Horses used in this study were from the UGA Horsemanship herd. Horses were mares and geldings of various breeds and ages. Age range was from 4 to 18 years. All horses in the herd were selected for student use based upon their quiet demeanor and low reactivity. Both qualities make them suitable for teaching beginner level students.

Objectives 2 & 3: Gains from Learning Methods

In this section, three tables are used to examine the second and third objectives of this study. Tables 1a and 1b display the core data collected during skills testing for each student in the study. Equine knowledge and assigned practice group start the chart as these are the identifiers used to sort the chart for ease of evaluation. Following, skills test scores for test 1, test 2, and the difference between testing are displayed. Table 1a displays scores for haltering and 1b, wrapping. Practice time in minutes, journal response (1, positive or 2, negative) lead into student peak heart rate displayed in a similar fashion as the skill scores.

Adding depth to the data displayed in tables 1a and 1b is the statistical calculations from this data set in table 2. Independent sample t-tests were run on data from each table comparing skill score change, practice time, journal response (positive or negative) and peak heart rate during the second skills testing as measurements to track changes and improvement compared by practice group. From these calculations, significance was found at the alpha level of 0.05 in three measurements, score change for haltering, score change for wrapping, and practice time. Applying the statistical significance to data averages, we observe greater positive change in skill score among

students who learned by constructivism. As for the differences in practice time, we saw a difference in practice time averages with a practice time average for the wrapping group being almost twice as long as the average time for the haltering group.

Table 1a. Skills Test Data: Haltering (Skill Score, Practice Time, Journal Response, and Student Peak Hear Rate)

								Student Peak Heart Rate		
	Equine	Practice	Skills Test Scores			Practice	Journal			
Code #	Knowledge	Group	Test 1	Test2	Delta	Time	Response	Test 1	Test 2	Delta
116	1	1	7	8	1	15	1		114	
157	1	1	5	7	2	18	1	92	112	20
159	1	1	7	8	1	34	1		116	
161	1	1	6	7	1				106	
108	2	1	6	8	2	50	1		110	
147	2	1	6	5	-1	40	1	141	121	-20
154	2	1	5	7	2	42	1		123	
156	2	1	3	7	4	35		89	115	26
158	2	1	7	8	1	40	2	131	123	-8
164	2	1	6	7	1	44	2	117		
168	2	1	7	8	1	55	1	80	95	15
111	3	1	7	8	1	26	1		79	
112	3	1	5	8	3	30	1		85	
114	3	1	5	7	2	25	1			
115	3	1		8		30	1		107	
123	3	1	8	8	0	8	2		119	
153	3	1	6	8	2	14	1	105	112	7
174	3	1	5	7	2	38	1	119	129	10
134	4	1	7	7	0			118	101	-17
137	4	1	7	8	1	27	2	121	169	48
183	4	1	6	7	1	11	1	91	142	51
103	5	1	7	8	1		1		104	
107	5	1	6	8	2	55	2		135	
138	5	1	8	8	0	25	2	106	105	-1
173	5	1	6	6	0	30	2	85	116	31
175	5	1	5	8	3	30	2	99	110	11
Average	2.9		6.1	7.5	1.3	31.4		106.7	114.5	
163	1	2	6	6	0		1	115	105	-10
165	1	2	6	5	-1		1	100		
110	2	2	6	6	0		1		118	
130	2	2	7	7	0		1		85	
143	2	2	6	6	0		1	98	107	9
146	2	2	4	7	3		1	82	95	13

155	2	2	4	6	2	1	119	109	-10
160	2	2	6	6	0	1	120	121	1
113	3	2	6	8	2	1		109	
121	3	2	8	8	0	2			
122	3	2	6	6	0	1		94	
141	3	2	7	8	1	1	134	115	-19
142	3	2	7	7	0	1	97	109	12
150	3	2	8	7	-1	1	137	135	-2
169	3	2	5	6	1	1	207	122	-85
171	3	2	7	7	0	1	96	100	4
180	3	2	7	6	-1	1	84	88	4
181	3	2	6	6	0	1	120	117	-3
120	4	2	7	8	1	1		109	
140	4	2	8	8	0	2	126	110	-16
144	4	2	8	8	0	1	82	101	19
148	4	2	7	6	-1		119	115	-4
152	4	2	7	6	-1	1		101	
172	4	2	6	5	-1	2	84	86	2
177	4	2	6	6	0	1	104	124	20
106	5	2	7	7	0	2		120	
118	5	2	8	8	0	1		88	
149	5	2	6	6	0	2		101	
170	5	2	5	6	1	2		115	
182	5	2	6	6	0	2	110	104	-6
Average	3.2		6.4	6.6	0.2		112.3	107.3	

Table 1b. Skills Test Data: Wrapping (Skill Score, Practice Time, Journal Response, and Student Peak Hear Rate)

								Student Peak Heart Rate		
	Equine	Practice	Skills Test Scores			Practice	Journal			
Code #	Knowledge	Group	Test 1	Test2	Delta	Time	Response	Test 1	Test 2	Delta
116	1	1	6	7	1		1		125	
157	1	1	3	5	2		1		118	
159	1	1	3	3	0		1		128	
161	1	1	5	6	1				107	
108	2	1					1			
147	2	1	4	5	1		1	137	137	0
154	2	1	4	7	3		1	121	132	11
156	2	1	5	4	-1			106	138	32
158	2	1	4	8	4		2		121	
164	2	1	4	7	3		2			
168	2	1	7	6	-1		1		119	
111	3	1	6	8	2		1		80	
112	3	1	7	6	-1		1		105	
114	3	1	5	3	-2		1			
115	3	1		5			1		120	

123	3	1	6	5	-1		2		130	
153	3	1	5	7	2		1	112	121	9
174	3	1	3	3	0		1	130	130	0
134	4	1	8	6	-2			136	108	-28
137	4	1	6	4	-2		2	135	170	35
183	4	1	7	3	-4		1	115	140	25
103	5	1	8	7	-1		1		121	
107	5	1	7	8	1		2		150	
138	5	1	7	6	-1		2	98	119	21
173	5	1	6	6	0		2	80	92	12
175	5	1	7	6	-1		2	99	113	14
Average	2.9		5.5	5.6	0.1			115.4	122.8	
[redacted]										
163	1	2	6	8	2		1	120	111	-9
165	1	2	6	4	-2	57	1	98		
110	2	2	7	7	0	168	1		125	
130	2	2	7	8	1	50	1		115	
143	2	2	7	8	1		1	103	113	10
146	2	2	5	7	2	73	1	92	125	33
155	2	2	4	8	4	40	1	118	120	2
160	2	2	6	7	1	41	1	120	115	-5
113	3	2	6	7	1	58	1		120	
121	3	2	7	8	1	82	2			
122	3	2	8	6	-2	47	1		107	
141	3	2	5	8	3	75	1	135	132	-3
142	3	2	5	8	3	66	1	124	130	6
150	3	2	6	6	0	20	1	98	139	41
169	3	2	7	8	1	27	1	126	129	3
171	3	2	4	8	4	55	1	102	108	6
180	3	2	5	5	0	45	1	82	94	12
181	3	2	5	8	3	45	1	98	125	27
120	4	2	6	7	1	63	1		108	
140	4	2	7	8	1	19	2	119	110	-9
144	4	2	7	8	1	63	1	82	102	20
148	4	2	6	8	2	60		120	125	5
152	4	2	6	8	2	20	1		111	
172	4	2	6	8	2	54	2	115	110	-5
177	4	2	4	5	1	85	1	114	130	16
106	5	2	7	6	-1	50	2		134	
118	5	2	8	8	0	79	1		120	
149	5	2	8	8	0	105	2	100	120	20
170	5	2	6	8	2	6	2	126	127	1
182	5	2	7	8	1	46	2	110	112	2
Average	3.2		6.1	7.3	1.2	57.1		109.6	118.5	

Table 2. Statistical Analysis of Differences in Practice Groups

Value Measured	Group Average Black	Red	t	p	Df
Change in Halter Score T_1 to T_2	0.76	0.03	4.421	0.000*	53
Change in Wrap Score T_1 to T_2	-0.04	0.70	-3.117	0.003*	52
Practice Time	31.39	57.11	-3.699	0.001*	49
Journal Response	1.35	1.24	0.831	0.410	50
Student Peak HR (Haltering, T_2)	114.50	107.25	1.691	0.097	50
Student Peak HR (Wrapping, T_2)	122.78	118.46	1.039	0.304	49

Note. Between the Black and Red practice group, a significant difference was found when comparing the change in both haltering and wrapping scores from test one to test two as well as the amount of time spent practicing each skill (alpha level = 0.05). Levene's test results indicated to assume equal variances and p value was calculated using Independent Sample T-Test.

Discussion of Survey Results

Further into the chapter, survey results are displayed as percentages and divided into groups based upon the topic they address. Due to the design of the questions, it has come to the attention of the researchers that results are not completely comparable across time as intended. Further discussion of improvements to survey design will be presented in chapter five as will the researchers recommendations for a better fitting comparison model. From the survey results, individual questions offered helpful insight to the impacts of the out of lab practice and should still be included in the evaluation of data addressing objectives 2 and 3. Overall, survey results indicated that increased in confidence were experienced in both the haltering and wrapping practice groups, illustrative of constructivism. Additionally, anxiety levels decreased as 57.4% of all students responded saying that their anxiety toward working with horses had decreased and 70.3% responded that they were more comfortable with their assigned practice horse

after the barn hours experience. Testing anxiety questions also received responses that can translate to an increase in confidence. 65.4% of students felt that their anxiety towards future skills tests had decreased after skills test two and 88.5% of students disagreed with the statement that their stress levels increased during skills test two as compared to skills test one.

Objective 4: Impact of Student Stress on Equine Stress

The table below depicts all of the comparable heart rate data gathered in this study. (On data where heart rates were able to be collected in both the pre-test and post test lab period are shown here for the benefit of only showing comparable data to evaluate trend and relationship). Students have been sorted according to practice skill and previous equine experience as indicated from the initial survey. Heart rate data is grouped according to skills test and then follows the pattern of student and horse hear rate for skill A, haltering and then repeats for skill B, wrapping. At the conclusion of each group, averages are calculated and displayed. Statistical calculations of table 3 data follow in table 4.

Table 3: Student Peak Heart Rate (HR) Compared to Horse Average HR on Beats Per Minute Basis Compared by Practice Skill and Equine Experience

			Skills Test 1 (Pre-Test)				Skills Test 2 (Short Term Post-Test)			
	Practice	Eq.	Haltering		Wrapping		Haltering		Wrapping	
Code #	Skill	Exp.	Peak HR Student	Ave. Horse HR	Peak HR Student	Ave. Horse HR	Peak HR Student	Ave. Horse HR	Peak HR Student	Ave. Horse HR
134	Haltering	Y	118.0	33.1	136.0	40.0	101.0	33.3	108.0	34.2
137	Haltering	Y	121.0	35.8	135.0	37.6	169.0	36.6	170.0	36.5
138	Haltering	Y	106.0	31.5	98.0	35.8	105.0	35.3	119.0	38.2
153	Haltering	Y	105.0	33.6	112.0	36.5	112.0	34.8	121.0	34.7
173	Haltering	Y	85.0	32.0	80.0	32.7	116.0	40.0	92.0	37.1
174	Haltering	Y	119.0	30.2	130.0	32.7	129.0	34.3	130.0	32.6
175	Haltering	Y	99.0	32.0	99.0	34.1	110.0		113.0	39.6
183	Haltering	Y	91.0	32.0	115.0	33.0	142.0		140.0	
Average			105.5	32.5	113.1	35.3	123.0	35.7	124.1	36.1
147	Haltering	N	141.0	34.4	137.0	34.6	121.0	36.8	137.0	35.9
154	Haltering	N		31.0	121.0	30.0	123.0	42.8	132.0	31.4
156	Haltering	N	89.0	31.7	106.0	32.9	115.0	38.0	138.0	36.0
157	Haltering	N	92.0	34.1		30.3	112.0		118.0	
158	Haltering	N	131.0	30.0		32.1	123.0	33.4	121.0	32.7
164	Haltering	N	117.0	32.7		33.8		35.0		35.2
168	Haltering	N	80.0	34.5		33.2	95.0	34.7	119.0	36.9
Average			108.3	32.6	121.3	32.4	114.8	36.8	127.5	34.7
140	Wrapping	Y	126.0	47.2	119.0	45.4	110.0	35.0	110.0	35.7
141	Wrapping	Y	134.0	33.0	135.0	36.0	115.0	37.0	132.0	35.3
142	Wrapping	Y	97.0	32.4	124.0	36.6	109.0	38.0	130.0	34.4
144	Wrapping	Y	82.0	35.0	82.0	34.5	101.0	35.0	102.0	35.6
148	Wrapping	Y	119.0	35.3	120.0	34.3	115.0	34.0	125.0	36.0
149	Wrapping	Y		32.8	100.0	33.7	101.0	34.3	120.0	35.4
150	Wrapping	Y	137.0	36.7	98.0	36.4	135.0	36.0	139.0	35.1
170	Wrapping	Y		38.8	126.0	32.5	115.0	38.3	127.0	36.6
171	Wrapping	Y	96.0	30.4	102.0	31.0	100.0	36.7	108.0	33.5
172	Wrapping	Y	84.0	32.0	115.0	32.3	86.0	36.0	110.0	37.1
177	Wrapping	Y	104.0	33.5	114.0	32.5	124.0	33.8	130.0	33.8
180	Wrapping	Y	84.0	31.0	82.0	30.0	88.0	37.6	94.0	34.4
181	Wrapping	Y	120.0	32.9	98.0	30.8	117.0		125.0	31.8
182	Wrapping	Y	110.0	37.0	110.0	31.7	104.0		112.0	32.1
Average			107.8	34.9	108.9	34.1	108.6	36.0	118.9	34.8
143	Wrapping	N	98.0	33.0	103.0	38.1	107.0	36.0	113.0	36.2
146	Wrapping	N	82.0	33.6	92.0	36.6	95.0	36.0	125.0	35.6
155	Wrapping	N	119.0	31.5	118.0	31.6	109.0	38.0	120.0	36.0
160	Wrapping	N	120.0	30.7	120.0	32.7	121.0	36.0	115.0	36.3
163	Wrapping	N	115.0	31.4	120.0	31.2	105.0	34.0	111.0	34.4
165	Wrapping	N	100.0	31.5	98.0	34.5		35.6		35.0

169	Wrapping	N	207.0	32.0	126.0	33.5	122.0		129.0	36.8
Average			120.1	32.0	111.0	34.0	109.8	35.9	118.8	35.8

Note: Not all student data is shown, as one classes' heart rate data was lost during the pre-test.

Table 4: Statistical Analysis of Student Peak HR vs. Horse Average HR

In the table below, independent sample t-test statistics were run and in all cases, the data does not show evidence that there is a statistically significant (at the alpha level of 0.05) relationship among different groups of students when comparing student peak heart rate and horse average heart rate during the second skills test. Second skills test data was used to evaluate any differences that the out of lab practice may have caused on heart rate during skills testing as a measure of stress. Horse average heart rate is calculated on an average beats per minute basis. In all cases except one, indicated by "*", Levene's test produced values indicating to assume equal variance.

	Group Average: Black				
Value Measured	Experience	No Exp.	t	p	Df
Student Peak HR (Halter, T_2)	123.0	114.0	0.805	0.436	12
Average Horse HR (Halter, T_2)	35.7	36.8	-0.635	0.540	10
Student Peak HR (Wrap, T_2)	124.1	127.5	-0.331	0.746	12
Average Horse HR (Wrap, T_2)	36.1	34.7	1.124	0.285	11
	Group Average: Red				
Value Measured	Experience	No Exp.	t	p	Df
Student Peak HR (Halter, T_2)	108.5	109.8	-0.207	0.833	18
Average Horse HR (Halter, T_2)	36.0	35.9	0.056	0.956	16
Student Peak HR (Wrap, T_2)	118.9	118.8	0.004	0.997	18
Average Horse HR (Wrap, T_2)	34.8	35.8	-1.558	0.136	19
	Group Average: Experience				
Value Measured	Black	Red	t	p	Df
Student Peak HR (Halter, T_2)	123.0	108.6	1.890	0.073	20
Average Horse HR (Halter, T_2)	35.7	36.0	-0.279	0.784	16
Student Peak HR (Wrap, T_2)	124.1	118.9	0.684	0.502	20
Average Horse HR	36.1	34.8	1.561	0.135	19

(Wrap, T_2)					
	Group Average: No Experience				
Value Measured	Black	Red	t	p	df
Student Peak HR (Halter, T_2)	114.8	109.8	0.827	0.428	10
Average Horse HR (Halter, T_2)	36.8	35.9	0.578	0.576	10
Student Peak HR (Wrap, T_2)	127.5	118.8	1.823	0.098	10
Average Horse HR (Wrap, T_2)*	34.7	35.6	-1.153	0.291	6.3

Note: Comparison groups were created by comparing practice group and prior equine experience as indicated by responses to the initial survey. Once comparison was evaluated assuming non-equal variance, indicated by *. No statistical significance was found at alpha = 0.05.

Objective 5: VARK Results and Impact on Student Improvement

Tables 5 and 6 below both show the counts of different VARK results compared to increase, decrease, or no change in skill score from test one to test two further divided by practice group. From the data shown in previous sections we expect to see a larger amount of students improving in the skill that they were assigned to practice, but what is not known is if there is a correlation between learner preference (as identified by VARK) and change in score. Tables 5 and 6 identify learners as visual (V), auditory (A), reader (R), kinesthetic (K), or a combination of two or more preferences. No trends observed between VARK results and skill performance changes. Results of relatedness of VARK score to skill improvement were statistically significant at the alpha 0.05 level in all cases except one, indicated by "*" in the table. Chi-square test for was conducted using SPSS software and is displayed in table 7. Values for table 7 were calculated using the data displayed in tables 5 and 6 with the exception of counts resulting from more than one preferred skill as they skewed the expected counts for Chi Square Analysis.

Table 5. VARK Results Compared to Skill Score Change (Test 1 to Test 2) Black Practice Group (Haltering)

	Haltering			Wrapping		
VARK Result	Decrease frequency	No Change frequency	Increase frequency	Decrease frequency	No Change frequency	Increase frequency
V			1			1
A			5	4		1
R		1	4	3		2
K		3	7	3	3	4
2+	1		3	1		2
3+						
TOTAL	1	4	20	11	3	10

Note: The most common VARK result was kinesthetic (K), n=20, out of the 25 total students in the Black group. For the wrapping skill, total students equals 24 due to one student having an injury and being unable to complete the skill.

Table 6. VARK Results Compared to Skill Score Change (Test 1 to Test 2) Red Practice Group (Wrapping)

	Haltering			Wrapping		
VARK Result	Decrease	No Change	Increase	Decrease	No Change	Increase
V		1				1
A		2	1			3
R		5	4	1	1	7
K	4	7	1	2	2	8
2+	1	2	1		2	2
3+	1					1
TOTAL	6	17	7	3	5	22

Note: The most common VARK result was kinesthetic (K), n=24, out of the 30 total students in the Red group.

Table 7a. Chi Square Analysis of VARK Results Compared to Change in Skill Scores (Test 1 to Test 2) for Black Practice Group (Haltering)

	VARK	Change in Halter Score T1 to T2	Change in Wrap Score T1 to T2
Chi-Square	9.273	8.048	3.714
df	3	1	2
p	0.026	0.005	0.156*

Table 7b. Chi Square Analysis of VARK Results Compared to Change in Skill Scores (Test 1 to Test 2) for Black Practice Group (Wrapping)

	VARK	Change in Halter Score T1 to T2	Change in Wrap Score T1 to T2
Chi-Square	12.600	8.240	29.880
df	3	2	3
p	0.006	0.016	0.000

Survey Responses

Overall the survey data are inconclusive and can only be used to help provide depth to skill scores and heart rate measures as well as assist in improving surveys in following studies. From select questions qualitative data was interpreted to show gains in confidence after out of lab practice in the areas of haltering, wrapping, working with horses, and skills testing. In the following sections survey data is displayed and discussed, taking care to highlight the important aspects of this data set.

Table 8. Survey Questions and Topics Addressed

QUESTION CODE	QUESTION	TOPIC ADDRESSED
S1 (all Qs)	Demographics	Demographics
S2Q1	The material provided on skill A explains how to complete the skill in a clear manner.	Handouts Provided
S2Q2	The material provided on skill B explains	Handouts Provided

	how to complete the skill in a clear manner.	
S2Q3	After watching the demonstration of skill A, I feel that I can complete the skill to the fullest extent as indicated by the rubric provided in class.	Haltering
S2Q4	After watching the demonstration of skill B, I feel that I cannot complete the skill to the fullest extent as indicated by the rubric provided in class.	Wrapping
S2Q5	I have low anxiety about performing skill A.	Haltering
S2Q6	I have high anxiety about performing skill B.	Wrapping
S2Q7	In general, I am nervous about working with and around horses.	Anxiety caused by horses
S2Q8	In general, I have get very nervous when taking tests.	Test anxiety
S3Q1	I feel that my anxiety about working with and around horses in general has decreased since the last skills test.	Anxiety caused by horses
S3Q2	I attribute my response to Question 1 mostly to the out of lab practice sessions.	Anxiety caused by horses
S3Q3	I feel that my ability to perform skill A (Haltering a Horse) to the fullest extent, as indicated by the rubric, has improved since the last skills test.	Haltering
S3Q4	I feel that my ability to perform skill B (Applying a Standing Pillow Wrap) to the fullest extent, as indicated by the rubric, has improved since the last skills test.	Wrapping
S3Q5	Over the past two weeks, my comfort level around my assigned skills test horse has improved.	Anxiety cause by horses
S4Q1	After completing the second skills test, I feel that my ability to perform Skill A has improved.	Haltering
S4Q2	After completing the second skills test, I feel that my ability to perform Skill B has improved.	Wrapping
S4Q3	After the second skills test, my anxiety level in regards to future skills test scenarios has decreased.	Test anxiety
S4Q4	Compared to the first skills test, nervousness during the second skills test has increased.	Test anxiety

S5Q1	After completing the final skills test, I feel that my ability to complete Skill A (Haltering a Horse) has…	Haltering
S5Q2	After completing the final skills test, I feel that my ability to complete Skill B (Applying a Standing Pillow Wrap) has…	Wrapping
S5Q3	My level of anxiety when completing Skill A during the most recent skills test scenario…	Haltering
S5Q4	My level of anxiety when completing Skill B during the most recent skills test scenario…	Wrapping

Note. Question Code refers to survey number and question number. Questions have been reverse coded as needed to reflect improvements in skills and confidence and allow for simplicity in evaluating results.

Table 9. Questions Addressing Handouts Provided to the Class

S2Q1	The material provided on skill A explains how to complete the skill in a clear manner.	Handouts Provided
S2Q2	The material provided on skill B explains how to complete the skill in a clear manner.	Handouts Provided

Question Code	Participant Group(s)	Strongly Disagree/Disagree	Neither	Agree	Strongly Agree	n
S2Q1	All	1.8%	1.8%	33.9%	62.5%	56
S2Q2	All	0.0%	5.4%	30.4%	64.3%	56

Table 10. Questions Addressing Haltering

S2Q3	After watching the demonstration of skill A, I feel that I can complete the skill to the fullest extent as indicated by the rubric provided in class.	Haltering
S2Q5	I have low anxiety about performing skill A.	Haltering
S3Q3	I feel that my ability to perform skill A (Haltering a Horse) to the fullest extent, as indicated by the rubric, has improved since the last skills test.	Haltering

S4Q1	After completing the second skills test, I feel that my ability to perform Skill A has improved.	Haltering

Question Code	Participant Group(s)	Strongly Disagree/Disagree	Neither	Agree	Strongly Agree	N
S2Q3	Black	3.8%	11.5%	34.6%	50.0%	26
	Red	0.0%	10.0%	23.3%	66.7%	30
S2Q5	Black	3.8%	19.2%	34.6%	42.3%	26
	Red	10.0%	10.0%	23.3%	56.7%	30
S3Q3	Black	20.8%	4.2%	41.7%	33.3%	26
	Red	40.0%	26.7%	20.0%	13.3%	30
S4Q1	Black	8.3%	20.8%	29.2%	41.7%	26
	Red	28.6%	25.0%	28.6%	17.9%	28

Figure 4.1. Agree/Strongly Agree Responses Addressing Confidence with Haltering

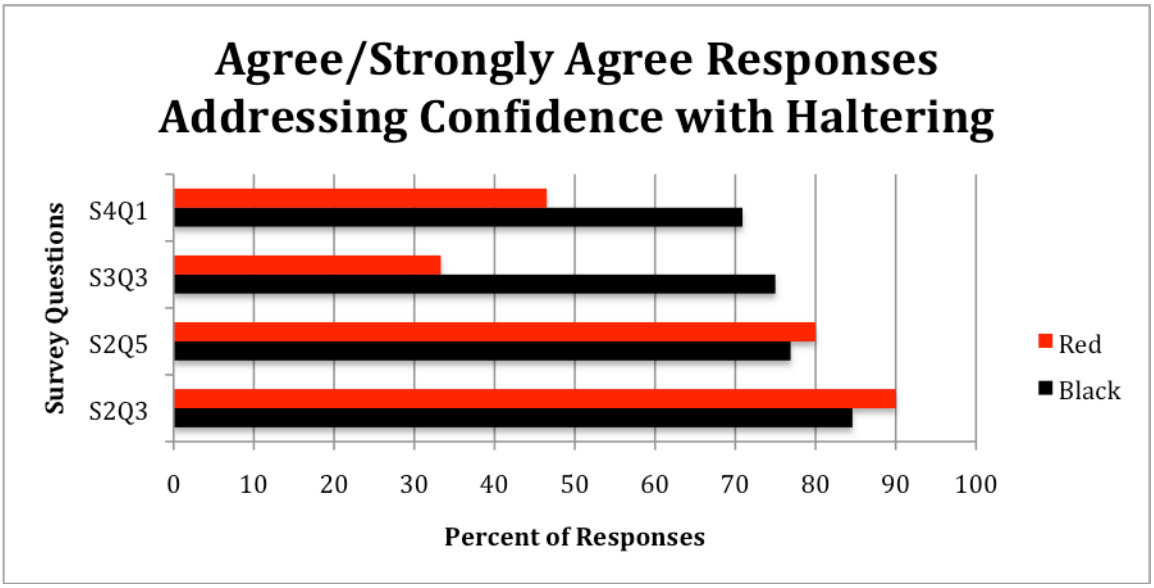

Table 11. Questions Addressing Wrapping

S2Q4	After watching the demonstration of skill B, I feel that I cannot complete the skill to the fullest extent as indicated by the rubric provided in class.	Wrapping
S2Q6	I have high anxiety about performing skill B.	Wrapping

S3Q4	I feel that my ability to perform skill B (Applying a Standing Pillow Wrap) to the fullest extent, as indicated by the rubric, has improved since the last skills test.	Wrapping
S4Q2	After completing the second skills test, I feel that my ability to perform Skill B has improved.	Wrapping

Question Code	Participant Group(s)	Strongly Disagree/Disagree	Neither	Agree	Strongly Agree	N
S2Q4	Black	26.9%	30.8%	19.2%	23.1%	26
	Red	50.0%	13.3%	6.7%	30.0%	30
S2Q6	Black	12.0%	28.0%	20.0%	40.0%	25
	Red	20.0%	16.7%	23.3%	40.0%	30
S3Q4	Black	42.0%	45.8%	8.3%	4.2%	24
	Red	16.6%	10.0%	13.3%	60.0%	30
S4Q2	Black	30.4%	17.4%	26.1%	26.1%	23
	Red	28.6%	10.7%	21.4%	39.3%	28

Figure 4.2. Agree/Strongly Agree Responses Addressing Confidence with Wrapping

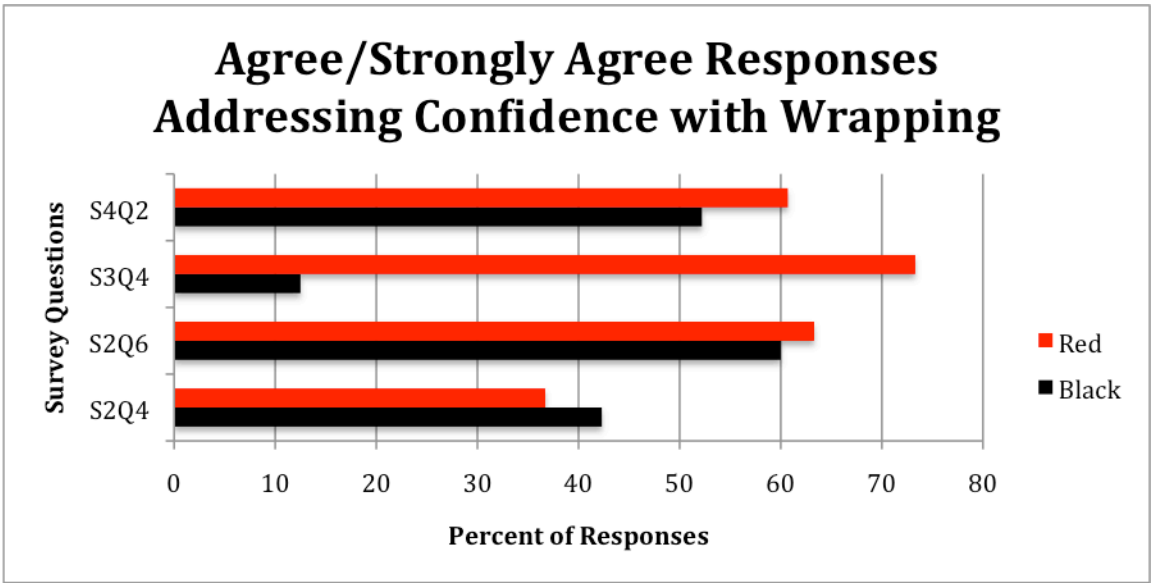

Table 12. Questions Addressing Stress Caused by Working with Horses

S2Q7	In general, I am nervous about working with and around horses.	Anxiety caused by horses

S3Q1	I feel that my anxiety about working with and around horses in general has decreased since the last skills test.	Anxiety caused by horses
S3Q2	I attribute my response to Question 1 mostly to the out of lab practice sessions.	Anxiety caused by horses
S3Q5	Over the past two weeks, my comfort level around my assigned skills test horse has improved.	Anxiety cause by horses

Question Code	Participant Group(s)	Strongly Disagree/Disagree	Neither	Agree/Strongly Agree	N
S2Q7	All	80.0%	9.1%	10.9%	55
S3Q1	All	31.5%	11.1%	57.4%	54
S3Q2	All	31.5%	31.5%	37.1%	54
S3Q5	All	16.7%	13.0%	70.3%	54

Table 13. Questions Addressing Stress Caused by Skills Testing

S2Q8	In general, I have get very nervous when taking tests.	Test anxiety
S4Q3	After the second skills test, my anxiety level in regards to future skills test scenarios has decreased.	Test anxiety
S4Q4	Compared to the first skills test, nervousness during the second skills test has increased.	Test anxiety

Question Code	Participant Group(s)	Strongly Disagree/Disagree	Neither	Agree/Strongly Agree	N
S2Q8	Black	38.2%	25.5%	36.4%	55
S4Q3	Black	7.6%	26.9%	65.4%	52
S4Q4	Black	88.5%	3.8%	7.7%	52

Table 14a. Exit Survey (Questions 1 and 2)

S5Q1	After completing the final skills test, I feel that my ability to complete Skill A (Haltering a Horse) has…	Haltering
S5Q2	After completing the final skills test, I feel that my ability to complete Skill B (Applying a Standing Pillow Wrap) has…	Wrapping

Question Code	Participant Group(s)	Continuous Improvement	Only Improved from T_1 to T_2	Only Improved from T_2 to T_3	No Change	N
S5Q1						
	Black	2 (50%)	1 (25%)	0	1 (25%)	4
	Red	1 (11%)	4 (44%)	0	4 (44%)	9
S5Q2						
	Black	3 (75%)	1 (25%)	0	0	4
	Red	2 (22%)	6 (66%)	0	1 (11%)	9

Table 14b. Exit Survey (Questions 3 and 4)

S5Q3	My level of anxiety when completing Skill A during the most recent skills test scenario…	Haltering
S5Q4	My level of anxiety when completing Skill B during the most recent skills test scenario…	Wrapping

Question Code	Participant Group(s)	Increased	Decreased	No Change	N
S5Q3					
	Black	0	2 (50%)	2 (50%)	4
	Red	2 (22%)	2 (22%)	5 (56%)	9
S5Q4					
	Black	0	4 (100%)	0	4
	Red	2 (22%)	3 (33%)	4 (44%)	9

S5Q5: Additional Comments Addressing the Entire Study

This question was an opportunity for students to provide any comments about the study that they would like to voice after completing the final skills test.

- Was hard to remember skill B [wrapping] for final test but was eventually able to do so.

- I think that my skills got worse from the 2nd testing to the most recent. This is probably due to lack of practice between testing.
- Sometimes the testing took too long to wait for your turn.
- It seemed to be effective for what you needed. Spacing out the final was helpful because it judged our memory of the skill.
- I think a different skill should replace the haltering, other than that I thought the skills tests were great! Thanks.
- I think that at the beginning of the semester it was helpful to practice during the barn hours but since then my ability to perform the skills has decreased.
- Wish we had been able to practice more than skill because the difficulty of the skills was different. Practicing did help increase my confidence level with the skill that I practiced!
- Previous knowledge helped me with the skills test. I was already comfortable with performing the skills.
- Just being able to practice doing skill B (pillow wrap) has improved my technique but otherwise I didn't have any anxiety from the start.

Journal Responses

Greater positive responses to out of lab practice were seen in groups with average and below average prior equine knowledge. Reoccurring positive comments from journals were: more one on one time with instructors, more animals to work with, decreased pressure from time constraints and peer pressure. Reoccurring negative comments were: skills were too basic, took away from time that had been put aside for

other activities such as work, and preference to working with own horse versus university horses. Journal responses were determined positive or negative based upon domain analysis. Journals were marked as having an overall positive or negative outlook on barn hours practice and placed in either category. When reading selected quotes shared below, please be aware that some quotes may appear negative but included in the positive section. This is because the overall tone of the journal entry was positive, but the comment was viewed as a constructive criticism. In the table below (13), domain analysis results have been quantified and compared against the self-reported equine knowledge levels from the initial survey. Here we see a greater amount of positive responses in the average and below average groups as compared to the above average groups.

Table 15. Journal Responses Sorted by Domain Analysis

Self-Reported Equine Knowledge	Positive Journal Responses	Negative Journal Responses	n
Below Average	88.2%	11.8%	19
Average	88.2%	11.8%	16
Above Average	38.9%	61.1%	20

Selected Quotes from Journal Responses

To evaluate the journal entries, each students' response was read and then labeled as either positive or negative toward the out of class practice. In the quotes below, most clearly fit into the category that they appear in, but the reader should keep in mind that though a journal entry may have been either positive or negative overall, the quote

selected from the entry may appear to be the alternate. This exerts were viewed as constructive critique comments from the researcher and still fit within the assigned domain.

Positive Journals (Student Reported Knowledge Level in Italics)

"Working outside lab helps me learn better. I have come to know I am much more a hands on learner than a visual learner." *Below Average*

"Using the same horse did make me more comfortable and confident with not only the skill but to help with being comfortable with general horse interaction." *Average*

"I have been around horses my whole life, so completing a pillow wrap does not change how comfortable I feel around horses. I do think that I would feel more comfortable with a pillow wrap if I got to do them on multiple horses." *Above Average*

"As someone who has little to no experience with horses working in smaller groups also helps me to feel more comfortable. I am afraid with a larger group of people that the horse will get spooked and become unpredictable." *Below Average*

"I was able to figure some things out on my own that I couldn't before, and I think that is due to the fact that I was more comfortable around the animal." *Below Average*

"Somewhat useful, but it would be much more useful with more advanced skills. So I would have rather wrapped the horse during barn hours than halter the horse." *Excellent*

"I would rather work outside of lab time at the barn because it gives me time to get comfortable at my pace." *I know nothing about horses*

"It would've been nice to practice other skills that would be on our lab final during barn hours and not just haltering and pillow wrapping." *Average*

Negative Journals (Student Reported Knowledge Level in Italics)

"Once again I feel that barn hours didn't help me at all, but it did seem to help others. I would prefer barn hours to be extended lab hours instead so I didn't have to drive back out to the arena three days. Bell [horse used for practice] was very nice when haltering and didn't ever run away but she didn't play any role in boosting my confidence levels because I'm very comfortable at performing this skill." *Above Average*

"I can't say I improved on my confidence with horses by working with them a few minutes, but that's probably because I'm used to working with them every day. The horse I worked with today was very cute, but I think he smelled the treats that used to be in my pockets and the hay on my jacket. I had to convince him my clothes were not edible." *Excellent*

"I don't think the barn hours were useful because it takes a lot of time to commute to the barn and I already know the skill." *Above Average*

"I do not understand why myself and anyone else who can accurately do the activity has to come back all three times. I think if one is able to accurately on the first time do the activity, he/she should not be required to come back." *Below Average*

"I would prefer neither. I would hope that everything that needs to be covered can be adequately covered during the class and lab times without having to extend the lab time or coming out when we are technically not scheduled for class. If I absolutely had to choose I would rather have lab time extended because at least then it would be on the schedule and not an "extra" outside of class thing to do." *Excellent*

Evaluation of Core Hypotheses

The core question of this study was which method of teaching creates the most improvement in student achievement, behaviorism or constructivism? Placed into a formal hypothesis format, this question reads for each skill as:

$H_{0:\ \text{Haltering}} : \Pi_{\text{Improvement in Score Black Practice Group}} = \Pi_{\text{Improvement in Score Red Practice Group}}$
$H_{A:\ \text{Haltering}} : \Pi_{\text{Improvement in Score Black Practice Group}} \neq \Pi_{\text{Improvement in Score Red Practice Group}}$

$H_{0:\ \text{Wrapping}} : \Pi_{\text{Improvement in Score Black Practice Group}} = \Pi_{\text{Improvement in Score Red Practice Group}}$
$H_{0:\ \text{Wrapping}} : \Pi_{\text{Improvement in Score Black Practice Group}} \neq \Pi_{\text{Improvement in Score Red Practice Group}}$

Summarized, these hypotheses pose the question, was there a difference in student achievement due to learning method? The null hypothesis was set to assume that there is not a difference between learning methods and the alternative hypothesis will be true if either of the learning styles created greater gains in student improvement. Statistical evaluation was done using counts of students who improved in score against counts of

students who showed no change or decreased in score from test one to test two. Below you will find two tables that display the data used to calculate statistics for the hypothesis shown above. Each table shows the number of students who either improved or showed no change or a decline in their score. Data was sorted by practice groups where Black was constructivism for haltering and Red was constructivism for wrapping. Both were behaviorism for the skill that was not assigned for practice.

Table 16: Count of Improvement and Decline in Haltering Scores from Test 1 to Test 2

Practice Group	Improvement in Score	No Change/Decline in Score	n
Black	20	5	25
Red	7	23	30

Pearson X^2 test statistic = 17.52 df = 1
p = <0.0002 Fisher Exact p = 0.000037
*p values are two tailed

Table 17: Count of Improvement and Decline in Wrapping Scores from Test 1 to Test 2

Practice Group	Improvement in Score	No Change/Decline in Score	N
Black	10	14	24
Red	22	8	30

Pearson X^2 test statistic = 5.54 df = 1
p = 0.0372 Fisher Exact p = 0.026597
*p values are two tailed

For both skills, strong evidence to reject the null and accept the alternative hypothesis was found. Haltering produced an exact p value of 0.000037 and wrapping produced an exact p value of 0.026597, both falling below the set alpha level of 0.05. Looking at the counts chart and comparing to the found p value, in both skills we find that the group learning from constructivism produced greater gains in skill score, with higher correlation found with the more basic skill.

CHAPTER 5

CONCLUSIONS AND RECCOMENDATIONS

Data Evaluation

When evaluating the data, researchers found some statistical significance, shared in the previous chapter. Though statistical significance was limited on certain areas of the study, viewed as descriptive data from a pilot study, all of the data collected can offer insight and depth the conclusions of this study. Researchers feel that any limits of the statistical significance may due to small sample size or reduced data collection from technical difficulties. All data collected was displayed in chapter four as were statistical calculations, paired T-test and Chi Square, as fitting. Alpha levels for this study were set at 0.05.

Conclusions

From the data gathered and shared in chapter four, combined with the data shown in the section above, constructivism is a more effective mechanism for learning in the hands on laboratory setting specific to animal sciences. In the literature review, most similar studies showed support of hands on learning through survey data of students after completion of coursework and therefore can only be loosely compared. It is important to note the unique design of this study and that no data collected here can be identically compared to past studies but gains merit in that fact that a new method of evaluation has been developed and tested. Here we have numerical data to create further support for and a solid launching pad for future studies expanding off of these findings. For further

clarification of this overall conclusion, a summary of results from chapter four has been provided below and will be followed by a discussion of results in relation to the research questions.

Table 18: Trends in Data from Chapter 4

Data	Summary
Skill score comparisons found that constructivism groups produced greater average score changes from test 1 to test 2 (Haltering: 1.3, Wrapping: 1.2) compared to the behaviorism groups (Haltering: 0.2, Wrapping: 0.1). Average practice time for haltering was 31.4 minutes and 57.1 minutes for wrapping.	Constructivism produced greater gains in ability to correctly complete skills. Students assigned the advanced skill practiced almost twice as long on average as those assigned the basic skill.
Statistical significance was found when comparing data from tables 1a and 1b at the alpha level of 0.05. Change in skill score for both skills showed significant differences between data from both practice groups.	Combining this information with the raw skill data and group averages we have strong support for constructivism creating greater positive changes in skill score.
Chi Square analysis produced p values below 0.05 when comparing improvement in scores against practice groups. In addition, greater counts of improvement were seen with constructivism.	Evidence to support constructivism creating greater skill improvement.
Average heart rates for both groups increased from test 1 to test 2 with the exception of the Red group for haltering (their behaviorism skill).	Increased physiological stress response from test 1 to test 2.
T-tests produced no significance in all groups (skill practice groups and prior equine experience vs. no experience) when comparing average peak student heart rate to average horse heart rate	No significant data.
Chi square analysis found statistical significance at the alpha level of 0.05 when comparing changes in score against VARK results, with the exception of change in wrap score vs. VARK results for the Black practice group (Practiced	There may be a relationship between VARK result and skill improvement. Most students in this

Haltering). Also, the highest count for a learning preference was seen in the K (kinesthetic) group.	population were hands on learners.
88.2% of journals from average and below average knowledge self scored students produced positive reflections on barn hours where above average knowledge students only produced 38.9% positive journals.	Barn hours were more useful for students with greater room for improvement.
Surveys indicate increased confidence in practice skill, decrease in anxiety towards working with horses and the assigned lab horse, and decreased anxiety towards and during skills testing.	Increase in confidence.

This summary helps to illustrate how the positive gains from constructivism were greater than behaviorism beyond just skill score improvement. Students who learned by constructivism expressed increases in confidence in addition to their increased scoring during the second skills test. Horse heart rate did not offer much change, but the researchers feel this is due to the calm nature of the horses in the study resulting in low reactivity. It is also important to note that heart rate data from this study is not statistically significant when evaluating horse and human interaction during skills testing and can be deemed inconclusive as multiple external factors may have influenced data in addition to the small sample size being evaluated statistically. Some identified external factors identified during the defense of this thesis were hormone cycles impacting resting heart rate and reactivity, each student having a unique resting heart rate, impact of caffeine or stress due to other factors as well as changes in physical fitness status. Though there are many factors mentioned, the researchers feel that heart rate data can be useful as an additional descriptive tool and learning opportunity for planning future studies.

When comparing data based on student skill levels, results showed that learning by constructivism was most impactful with those who possessed less knowledge prior to the start of class and therefore more room for improvement. The researchers feel that some ambiguity may be associated with this finding due to the simplicity of the tested skills. Based upon journaling responses and feedback during the study the researchers suggest that the skills may have just been too simplistic for those with prior horse knowledge and pose the question that different results may be found when testing with more advanced skills.

From data shared in the previous chapter conclusions can be drawn and observations made to suggest answers to the four research questions stated in the first chapter.

1. *In animal science laboratory courses, is there a difference between learning by the Behaviorism theory versus the Constructivism theory?*

   Yes, in this study evidence was found in support of constructivism as a method of learning. Greater gains in skill score improvement were found from test one to test two in the constructivism group, as well as gains in confidence in skill performance, ability to work with horses, and with skills testing situations.

2. *Does teaching by different learning theories create differences in student confidence changes and satisfaction with the coursework required of them?*

Through survey and journals, evidence was found in support of constructivism increasing confidence and depth of student coursework. Working off of Bandura's interpretation of self-efficacy, the researchers can piece together information to explain what occurred for student through barn hours experiences. Students who viewed that they have room for improvement in knowledge and skill were empowered by the out of lab practice that was less stressful both due to increased time and decreased peer judging. The skills presented to them were engaging and the freedom to practice the skill when time allowed and at their own pace they were able to experience greater confidence and therefore expand expectations for their performance with this skill. In this interpretation of data and theoretical framework, the empowered student becomes comfortable with setting larger goals for themselves in the course.

3. *What is the impact of the horse-human relationship in the classroom laboratory study?*

From journal responses, researchers found that increased exposure to the class horses helped decrease nervousness in students. When statistical calculations were conducted, significance was found in relationship between student peak heart rate and horse average heart rate despite the impression of limited change from data displayed in tables in the previous chapter. Additionally, student heart rates decreased as exposure increased, yet increased from the basic skill to the advanced skill. It should be noted that the increase from basic to advanced skill does not have a definite cause

but the researchers believe that it may be due to increased stress or simply a biological symptom of changing body positions from standing to kneeling. Horse heart rate was less clear as changes from test one to test two were more subtle and trends were not uniform.

4. *Additionally, how can one optimize learning in the non-traditional classroom environment?*

By increasing hands on opportunities with smaller student groups, learning can be optimized. Stress was reduced by allowing for more one-on-one mentoring time with class supervisors, decreasing peer pressure, and increasing the amount of available lab animals to work with. In this environment, students were able to create greater gains in improvement. Trends relating to learning style, as identified by VARK, were found when evaluated by Chi square analysis with one exception. Additionally, and possibly more important, the most prevalent learner preference in this population was kinesthetic. These were hands on learners, which can help to justify why constructivism was so successful in this population.

Recommendations for Practical Application

For practical application, the researchers recommend that teaching by constructivism be utilized in vocational type animal science courses. Learning through practice produces students who are more capable and confident when completing tasks taught during the class. In a college level course where students are expected to be

capable of entering industry with specific skills, it is necessary to ensure that they are in fact able to do so. Producing students who achieve these gains not only reflects well on the course instructor, but also on the university from which they earn their degree and represent.

With limited funding, it becomes the role of faculty to provide rationale for funding and utilize lab resources and animals responsibly. From the data collected in this study, we recommend allocating more hands on activities to classes where the majority of students are entering with little prior knowledge, and as the prior knowledge level increases to decrease the amount of hands out activities or continue to provide hands on experience while also increasing skill difficulty to continue student engagement in the activity. The allocation of hands on experience will help to facilitate the constructivism method and help solidify knowledge gains in the student while still utilizing resources wisely and creating a sense of learner ownership in the activity.

An additional suggestion would be to hold open hours at lab facilities for all students. These open hours opportunities would allow for students to practice the skills required of them on their own with a mentor nearby to answer questions and maintain safety standards. In an effort to reduce costs of manning these office hours, an additional suggestion is provided. We recommend placing one or more faculty members in charge of supervision of open barn hours with rotating responsibility. In support of the rotating faculty members, graduate students could act as additional mentors and supervise under the direction of the rotating faculty. By dividing responsibility of open barn hours in this manner you can increase student relationships with faculty members beyond their direct instructors and also create teaching experience opportunities for graduate students. No

literature was found in support or disproof of this suggestion, which adds a new aspect to this recommendation as a possible research question.

Recommendations for Future Research

For future studies, the researchers recommend breaking up the objectives of this study into individual trials. Due to the experimental nature of this study, objectives were compiled to increase understanding of the differences between learning by behaviorism versus constructivism. From the data collected, the topics that warrant further exploration are the continuation of evaluating constructivism as a learning style, student confidence changes, lab animal handling stress, and examining the relationship between student skill level and needs for hands on experience.

In addition, three major changes to methodology are recommended. First, utilize a ranking system for student confidence. To further understand confidence changes, comparing confidence on a numerical scale before and after hands on practice can help to clarify student responses beyond the response "increase" or "decrease". Second, use more reactive horses when evaluating student and equine stress by heart rate. Also, if evaluating heart rate, it is suggested to use a small group of students and horses and more sensitive and descriptive heart rate monitors in efforts to decrease the time needed to outfit horses and students with horses combined with minimizing technical difficulties. In studies conducted in Europe examining the horse-human relationship more advanced methods of measuring heart rate were utilized, such as calculating variability. With change in study design and more sensitive equipment, such as an Echo Cardiogram (EKG) monitor, these calculations would be possible and create more comparable data. Due to each student having a different baseline heart rate, data from this study can only

be used to compare trends and researchers feel that greater depth to the measurements would have been helpful when reviewing data.

Third, when further evaluating behaviorism versus constructivism to execute a pre-test at the beginning of the semester and a post-test at the conclusion. This new timeline combined with teaching some skills by behaviorism and others by constructivism would be less time intensive than prescribing a practice and no practice group to monitor throughout the semester. An additional suggestion from the researchers would be to consider use of videotape to film class activities and then at a later date view the observational data and record behavior patterns of students learning by both mechanisms.

An alternative suggestion to the full semester timeline would be to collect data in a educational clinic setting. Spanning data over a period of days rather than months could create less labor for the researchers and allow for more in-depth data collection for that short burst of time. The tradeoff however would be sacrificing the potential for constructivism to be fully effective and make in fact create an environment where behaviorism shine through for short mimicry of skills rather than constructing solid pathways of knowledge. If a short timeline were utilized, it would be interesting to come back and re-test the population to see skill retention in the population when learning under an imposed time limit.

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APPENDIX A: IRB APPROVAL FORM

The University of Georgia

Office of The Vice President for Research
DHHS Assurance ID No. : FWA00003901

Institutional Review Board
Human Subjects Office
612 Boyd GSRC
Athens, Georgia 30602-7411
(706) 542-3199
Fax: (706) 542-3360
www.ovpr.uga.edu/hso

APPROVAL FORM

Date Proposal Received: 2012-11-16 **Project Number:** 2013-10424-0

Name	Title	Dept/Phone	Address	Email
Dr. Kari Turner	PI	Animal and Dairy Science E.L. Rhodes Center 706-542-8588		kturner@uga.edu
Ms. Aubrey Lowrey	CO	ALEC 301-785-0156		alowrey8@uga.edu

Title of Study: Behaviorism vs. Constructivism: A Comparison of Laboratory Learning Styles

45 CFR 46 Category: Expedite 4,7
Parameters:
None;

Change(s) Required for Approval:
Revised Application;
Revised Consent Document(s);

Approved : 2013-01-11 **Begin date : 2013-01-11** **Expiration date : 2014-01-10**

NOTE: Any research conducted before the approval date or after the end data collection date shown above is not covered by IRB approval, and cannot be retroactively approved.

Number Assigned by Sponsored Programs:

Funding Agency:

Your human subjects study has been approved.

Please be aware that it is your responsibility to inform the IRB:
. . . of any adverse events or unanticipated risks to the subjects or others within 24 to 72 hours;
. . . of any significant changes or additions to your study and obtain approval of them before they are put into effect;
. . . that you need to extend the approval period beyond the expiration date shown above;
. . . that you have completed your data collection as approved, within the approval period shown above, so that your file may be closed.

For additional information regarding your responsibilities as an investigtor refer to the IRB Guidelines.
Use the attached Researcher Request Form for requesting renewals, changes, or closures.
Keep this original approval form for your records.

Chairperson or Designee,
Institutional Review Board

APPENDIX B: CONSENT FORM

Dear Student:

I am a graduate student in the Department of Agricultural Leadership, Education, and Communication at The University of Georgia. I invite you to participate in a research study entitled *Behaviorism vs. Constructivism: A Comparison of Laboratory Learning Styles* that is being conducted under the auspices of Dr. K. Turner of the Department of Animal and Dairy Science. The purpose of this study is to examine different learning theories in the laboratory setting and identify the ways in which students learn best.

Students will participate in two different forms of learning during the laboratory section of your class. To evaluate improvement, we will use a rubric to evaluate your demonstration of two specific equine related skills in a skills test setting. The two skills we will ask you to perform are haltering a horse and applying a standing pillow wrap. Additionally, all students will be asked to complete journal entries during the learning of each skill. If you choose to participate we will also ask you to wear a heart rate monitor during the skills test and to fill out five surveys. The purpose of the journal entries and surveys is to track your confidence and gain feedback on the two different learning theories. The purpose of wearing the heart rate monitor is to track your anxiety levels during the skills tests. We will compare your heart rate to the heart rate of the horse and your skill improvement. This comparison of data will help to fully determine the type of learning style that works best in a laboratory class.

You are being identified as a possible research participant due to your enrollment in specific courses at the University of Georgia for the spring semester in 2013.

The only eligibility requirement of this study is for participants to be enrolled in ADSC 2000 Practicum in Animal and Dairy Science, ADSC 2630 Pleasure Horse Management, and/or ADSC 3630 Horse Production and Management.

Your participation in this research study, of course, is voluntary but would be greatly appreciated. In addition to your normal course work that is required of all students, as part of collecting data we will be asking research participants to wear a heart rate monitor during the course skills tests and complete five surveys documenting demographic information and confidence in relation to specific equine-related skills.

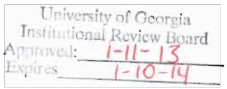
You may choose not to participate or to stop at any time without penalty or loss of benefits which you would otherwise be entitled. If you decide to withdraw from the study, the information that can be identified as yours will be kept as part of the study and may continue to be analyzed. Your decision to participate or not participate in the research will not affect your grade or class standing.

If you choose to participate in this research, you will be asked to:

1. **Fill out 5 surveys.**
2. **Wear a heart rate monitor during all skills tests.**
3. **Allow for skills test scores and journal entries to be included in the data collection.**

Participation in this study should take no more than 4 hours of your time in addition to normal class activities.

All individually-identifiable information will remain confidential, unless required by law. Your name will only be collected once, in the initial survey. Once surveys are collected and processed, a participant code will be assigned and from then on, you will be identified by student code only. Initial surveys will



be kept in a locked box and will only be seen by the researchers. Your name and all identifying information will be removed from the research records upon completion of data collection.

The results of the research study may be published, but your name will not be used. In fact, the published results will be presented in summary form only. Data collected for research intents will come from student surveys, heart rate monitor results, and results from class activities.

There are no foreseen risks and only minimal discomforts associated with participating in this research project. Discomforts may be due to wearing a heart rate monitor. To minimize discomforts, researchers will instruct participants on how to use the heart rate monitor and adjust for comfort. Additionally, participants will be offered the opportunity to ask questions and see the monitors before wearing in the skills test.

If you have any questions about this research project, please feel free to email me (Aubrey Lowrey) at alowrey8@uga.edu or Dr. Turner at kturner@uga.edu.

Questions or concerns about your rights as a research participant should be directed to The Chairperson, University of Georgia Institutional Review Board, 629 Boyd GSRC, Athens, Georgia 30602; telephone (706) 542-3199; email address irb@uga.edu.

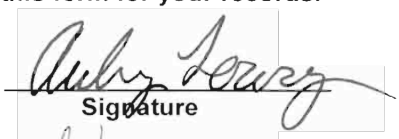
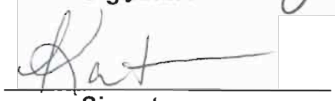
By completing and returning this consent letter, you are agreeing to participate in the above describec research project.

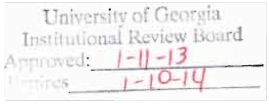
Thank you for your consideration! Please keep a copy of this letter for your records.

Sincerely,

Aubrey Lowrey

I understand that I am agreeing by my signature on this form to take part in this research project. Please keep a copy of this form for your records.

Aubrey Lowrey **Name of Researcher** **Email:** alowrey8@uga.edu	 **Signature**	1/13/13 **Date**
Dr. K. Turner **Name of Researcher** **Email:** kturner@uga.edu	 **Signature**	1/13/13 **Date**
Name of Participant	**Signature**	**Date**



APPENDIX C: INITIAL SURVEY AND VARK

Initial Survey: Student Demographics and Equine Experience

Part A: VARK Learning Styles Questionnaire

The VARK Questionnaire (Version 7.1)

How Do I Learn Best?

Choose the answer which best explains your preference and circle the letter(s) next to it.
Please circle more than one if a single answer does not match your perception.
Leave blank any question that does not apply.

1. You are helping someone who wants to go to your airport, the center of town or railway station. You would:
    a. go with her.
    b. tell her the directions.
    c. write down the directions.
    d. draw, or give her a map.
2. You are not sure whether a word should be spelled `dependent' or `dependant'. You would:
    a. see the words in your mind and choose by the way they look.
    b. think about how each word sounds and choose one.
    c. find it online or in a dictionary.
    d. write both words on paper and choose one.
3. You are planning a vacation for a group. You want some feedback from them about the plan. You would:
    a. describe some of the highlights.
    b. use a map or website to show them the places.
    c. give them a copy of the printed itinerary.
    d. phone, text or email them.
4. You are going to cook something as a special treat for your family. You would:
    a. cook something you know without the need for instructions.
    b. ask friends for suggestions.
    c. look through the cookbook for ideas from the pictures.
    d. use a cookbook where you know there is a good recipe.
5. A group of tourists want to learn about the parks or wildlife reserves in your area. You would:
    a. talk about, or arrange a talk for them about parks or wildlife reserves.
    b. show them internet pictures, photographs or picture books.
    c. take them to a park or wildlife reserve and walk with them.
    d. give them a book or pamphlets about the parks or wildlife reserves.
6. You are about to purchase a digital camera or mobile phone. Other than price, what would most influence your decision?
    a. Trying or testing it.
    b. Reading the details about its features.
    c. It is a modern design and looks good.
    d. The salesperson telling me about its features.
7. Remember a time when you learned how to do something new. Try to avoid choosing a physical skill, eg. riding a bike. You learned best by:
    a. watching a demonstration.
    b. listening to somebody explaining it and asking questions.
    c. diagrams and charts - visual clues.
    d. written instructions – e.g. a manual or textbook.

8. You have a problem with your heart. You would prefer that the doctor:
    a. gave you a something to read to explain what was wrong.
    b. used a plastic model to show what was wrong.
    c. described what was wrong.
    d. showed you a diagram of what was wrong.

9. You want to learn a new program, skill or game on a computer. You would:
    a. read the written instructions that came with the program.
    b. talk with people who know about the program.
    c. use the controls or keyboard.
    d. follow the diagrams in the book that came with it.

10. I like websites that have:
    a. things I can click on, shift or try.
    b. interesting design and visual features.
    c. interesting written descriptions, lists and explanations.
    d. audio channels where I can hear music, radio programs or interviews.

11. Other than price, what would most influence your decision to buy a new non-fiction book?
    a. The way it looks is appealing.
    b. Quickly reading parts of it.
    c. A friend talks about it and recommends it.
    d. It has real-life stories, experiences and examples.

12. You are using a book, CD or website to learn how to take photos with your new digital camera. You would like to have:
    a. a chance to ask questions and talk about the camera and its features.
    b. clear written instructions with lists and bullet points about what to do.
    c. diagrams showing the camera and what each part does.
    d. many examples of good and poor photos and how to improve them.

13. Do you prefer a teacher or a presenter who uses:
    a. demonstrations, models or practical sessions.
    b. question and answer, talk, group discussion, or guest speakers.
    c. handouts, books, or readings.
    d. diagrams, charts or graphs.

14. You have finished a competition or test and would like some feedback. You would like to have feedback:
    a. using examples from what you have done.
    b. using a written description of your results.
    c. from somebody who talks it through with you.
    d. using graphs showing what you had achieved.

15. You are going to choose food at a restaurant or cafe. You would:
    a. choose something that you have had there before.
    b. listen to the waiter or ask friends to recommend choices.
    c. choose from the descriptions in the menu.
    d. look at what others are eating or look at pictures of each dish.

16. You have to make an important speech at a conference or special occasion. You would:
    a. make diagrams or get graphs to help explain things.
    b. write a few key words and practice saying your speech over and over.
    c. write out your speech and learn from reading it over several times.
    d. gather many examples and stories to make the talk real and practical.

Part B: Equine Experience

**Please answer the following questions as completely as possible by circling the provided answer that *best fits* your situation.

**If answers are not provided, please fill in your response in the space provided.

1. **Have you been in control of a horse for 10 or more times where you are *in sole control* of the horse AND the horse *was not* in a stationary position? (circle one response)**

   Yes No

2. **My primary equestrian discipline is: (Circle ONE)**

Hunt Seat	Jumpers	Dressage	Eventing
Saddle Seat	Western Pleasure and Western Horsemanship	Games (speed events, gymkana, polo, etc.)	Cutting/Ranch Work
Recreational Trail	Endurance	Reining	Gaited

I do not ride horses

3. **How many years of formal riding lessons have you taken? Please answer to the nearest quarter of a year. If you do not currently or have not ever taken formal lessons, please answer "0".**

   The number of years I have taken formal riding lessons is _____.

4. **Are you currently a horse owner? If yes, how many horses do you or your family own? (circle one)**

   Yes No

   The number of horses I own is _____.

5. **Are you CURRENTLY leasing a horse? (circle one)**

   Yes No

6. **Have you ever owned or leased a horse IN THE PAST? (circle one)**

Yes No

***If your response to questions 4, 5, or 6 was "No" skip to question 8.**

7. **If you owned or leased a horse, was the horse housed on your property or did you board at another stable? In the event that you kept a horse at both locations during the ownership, select the location where your horse was housed for the majority of the time. (circle one)**

   My Property Boarding Facility

8. **At what level would you describe your Equine knowledge? Please check the box next to your answer.**

   ☐ Excellent

   ☐ Above Average

   ☐ Average

   ☐ Below Average

   ☐ I know nothing about horses

9. **Have you taken any Equine-specific courses at The University of Georgia in PREVIOUS SEMESTERS? (Please check the box next to the courses you have taken.)**

   ☐ ADSC 2500 Beginning Horsemanship

   ☐ ADSC 2630 Pleasure Horse Management

   ☐ ADSC 3230 Light Horse Evaluation and Selection

☐ ADSC 3250 Advanced Horse Evaluation and Selection

☐ ADSC 3500 Intermediate Horsemanship

☐ ADSC 3630 Horse Production and Management

☐ ADSC 3830 Equine Science Seminar

☐ ADSC 4200 Equine Merchandising

☐ ADSC 4230/6230 Anatomy and Biomechanics of the Horse

☐ ADSC 4390/6390 Horse Nutrition

☐ ADSC 4400/6400 Applied Reproduction in the Horse

☐ ADSC 4430 Equine Exercise Physiology

☐ ADSC Operant Conditioning and Training of the Horse

☐ Other: _____

☐ Other: _____

☐ Other: _____

10. Are you CURRENTLY enrolled in any Equine-specific courses at The University of Georgia? (Please check the box next to the courses you are taking THIS SEMESTER.)

☐ ADSC 2500 Beginning Horsemanship

☐ ADSC 2630 Pleasure Horse Management

☐ ADSC 3230 Light Horse Evaluation and Selection

☐ ADSC 3250 Advanced Horse Evaluation and Selection

☐ ADSC 3500 Intermediate Horsemanship

☐ ADSC 3630 Horse Production and Management

☐ ADSC 3830 Equine Science Seminar

☐ ADSC 4200 Equine Merchandising

☐ ADSC 4230/6230 Anatomy and Biomechanics of the Horse

☐ ADSC 4390/6390 Horse Nutrition

☐ ADSC 4400/6400 Applied Reproduction in the Horse

☐ ADSC 4430 Equine Exercise Physiology

☐ ADSC Operant Conditioning and Training of the Horse

☐ Other: _____

☐ Other: _____

☐ Other: _____

Part C: A little about you…

Name:_____

***Your name will only be used on this survey. After completion and processing, a participant code will be assigned and used on all future documents.**

Age:_____ **years**

Gender: (circle one):

Male	Female

Academic Year: (circle one)

Freshman	Sophomore	Junior	Senior	Senior+	Graduate

Ethnicity: (circle one)

White/Caucasian	African American	Asian American
Latino American	Hispanic	Native American
Pacific Islander	Other:	

Thank you!

APPENDIX D: SECOND SURVEY

Researcher Use Only

Student Code: _____

Second Survey: Post Skills Lesson/Pre Skills Test 1

Directions: Please respond to each statement by circling the number that corresponds with your level of agreement.

5= Strongly agree
4 = Agree
3 = Neither agree nor disagree
2 = Disagree
1 = Strongly disagree

1. **The material provided on skill A explains how to complete the skill in a clear manner.**

   1 2 3 4 5

2. **The material provided on skill B explains how to complete the skill in a clear manner.**

   1 2 3 4 5

3. **After watching the demonstration of skill A, I feel that I can complete the skill to the fullest extent as indicated by the rubric provided in class.**

   1 2 3 4 5

4. **After watching the demonstration of skill B, I feel that I cannot complete the skill to the fullest extent as indicated by the rubric provided in class.**

1 2 3 4 5

5. I have low anxiety about performing skill A.

1 2 3 4 5

6. I have high anxiety about performing skill B.

1 2 3 4 5

7. In general, I am nervous about working with and around horses.

1 2 3 4 5

8. In general, I have get very nervous when taking tests.

1 2 3 4 5

Thank you!

APPENDIX E: THIRD SURVEY

Researcher Use Only

Student Code: _____

Third Survey: Post Out of Class Practice Time/Pre Skills Test 2

Directions: Please respond to each statement by circling the number that corresponds with your level of agreement.

5= Strongly agree
4 = Agree
3 = Neither agree nor disagree
2 = Disagree
1 = Strongly disagree

1. **I feel that my anxiety about working with and around horses in general has decreased since the last skills test.**

   1 2 3 4 5

2. **I attribute my response to Question 1 mostly to the out of lab practice sessions.**

   1 2 3 4 5

3. **I feel that my ability to perform skill A (Haltering a Horse) to the fullest extent, as indicated by the rubric, has improved since the last skills test.**

   1 2 3 4 5

4. **I feel that my ability to perform skill B (Applying a Standing Pillow Wrap) to the fullest extent, as indicated by the rubric, has improved since the last skills test.**

   1 2 3 4 5

5. **Over the past two weeks, my comfort level around my assigned skills test horse has improved.**

1 2 3 4 5

Thank you!

Researcher Use Only

Student Code: _____

Fourth Survey: Post Skills Test 2/Student Reflection

Directions: Please respond to each statement by circling the number that corresponds with your level of agreement.

5= Strongly agree
4 = Agree
3 = Neither agree nor disagree
2 = Disagree
1 = Strongly disagree

1. **After completing the second skills test, I feel that my ability to perform Skill A has improved.**

   1 2 3 4 5

2. **After completing the second skills test, I feel that my ability to perform Skill B has improved.**

   1 2 3 4 5

3. **After the second skills test, my anxiety level in regards to future skills test scenarios has decreased.**

   1 2 3 4 5

4. **Compared to the first skills test, nervousness during the second skills test has increased.**

   1 2 3 4 5

5. **I feel that any improvement in skills performance is due to: (check the box next to the answer(s) that best fit)**

- ☐ Written materials provided in lab that dictate the proper way to perform
- ☐ Skill A
- ☐ Skill B
- ☐ Demonstration of Skill A during lab time
- ☐ Demonstration of Skill B during lab time
- ☐ Hands on practice time outside of lab
- ☐ Prior knowledge gained OUTSIDE of class
- ☐ Use of heart-rate monitors
- ☐ My skill performance DID NOT improve
- ☐ Other: _____

6. **I feel that any decrease in anxiety is due to: (check the box next to the answer(s) that best fits)**

- ☐ Written materials provided in lab that dictate the proper way to perform
- ☐ Skill A
- ☐ Skill B
- ☐ Demonstration of Skill A during lab time
- ☐ Demonstration of Skill B during lab time

☐ Hands on practice time outside of lab

☐ Prior knowledge gained OUTSIDE of class

☐ Use of heart-rate monitors

☐ My anxiety level (nervousness) has NOT decreased

☐ Other: _____

7. **I feel that the largest factor hindering my improvement was: (check the box next to the answer that best fits)**

☐ Written materials provided in lab that dictate the proper way to perform

☐ Skill A

☐ Skill B

☐ Demonstration of Skill A during lab time

☐ Demonstration of Skill B during lab time

☐ Hands on practice time outside of lab

☐ Prior knowledge gained OUTSIDE of class

☐ Use of heart-rate monitors

☐ My improvement was not at all hindered

☐ Other: _____

Thank you!

Researcher Use Only

Student Code: _____

Final Survey: Final Reflections After Final (Unannounced) Skills Test

Please answer the following questions by checking the box that corresponds to the answer that best fits. Please choose only one answer.

1. **After completing the final skills test, I feel that my ability to complete Skill A (Haltering a Horse) has: (check the box next to the ONE response which best completes the sentence)**

☐ My ability has improved at a continuous rate from the beginning of the semester to the end.

☐ My ability improved from the first skills test to the second, but not from the second to the final.

☐ My ability did not improve from the first skills test to the second, but did from the second to the final.

☐ My ability did not improve at all during the semester.

2. **After completing the final skills test, I feel that my ability to complete Skill B (Applying a Standing Pillow Wrap) has: (check the box next to the ONE response which best completes the sentence)**

☐ My ability has improved at a continuous rate from the beginning of the semester to the end.

☐ My ability improved from the first skills test to the second, but not from the second to the final.

☐ My ability did not improve from the first skills test to the second, but did from the second to the final.

☐ My ability did not improve at all during the semester.

3. **My level of anxiety when completing Skill A during the most recent skills test scenario… (check the box next to the ONE answer which best completes the sentence)**

☐ Has increased since the second skills test.

☐ Has decreased since the second skills test.

☐ Is at the same level as during the second skills test.

4. **My level of anxiety when completing Skill B during the most recent skills test scenario… (check the box next to the ONE answer which best completes the sentence)**

☐ Has increased since the second skills test.

☐ Has decreased since the second skills test.

☐ Is at the same level as during the second skills test.

5. **In the space provided below, please provide any comments about the skills test process. Specific details on changes in confidence, what helped you master skills, what hindered you from mastering**

skills, or anything that played a role in your performance would be appreciated.

Thank you for your **participation in this study.**
Have a great summer!

APPENDIX H: SKILLS TEST/BARN PRACTICE/JOURNALING ASSIGNMENT

Skills Test/Barn Practice/Journaling Assignment
Spring 2013

Skills Test

Two skills tests will occur during your lab time, the first will be to gain a base measurement for your knowledge of two skills (haltering a horse and applying a leg wrap) and the second to check for improvement. This is a class assignment which you can receive credit for.

Barn Practice/Barn Hours

This is also a class assignment, which occurs outside of lab time. After the initial skills test, a calendar will be posted with barn hours. These times are for you to come to the barn and practice the skill that we assign to you for barn hours. To receive full credit, you will need to come out to the barn **3 times, for 30 minutes each time.** When you come to the barn, bring your time log sheet. The log sheet will be used to record when you come to the barn, how much time you spend at barn hours, and to count as a record for you being there by getting a barn hours supervisor (Aubrey, Jordan, or Dr. Turner) to initial your log sheet.

**With this being said, if a student comes to barn hours and masters a skill before the 30 minutes are completed, they may leave early if they can demonstrate mastery of the skill to a barn hours supervisor.

Barn hours are set up in blocks. You DO NOT need to sign up for a time, just come by during the set up hours. During the hours, horses will be in the barn and ready to work with. We have tried to set this up in a way that works easily for most students. If you

have a major scheduling conflicts please email Aubrey at alowrey8@uga.edu with the subject line "Barn Hours".

If you **need a ride to the barn** email Aubrey at alowrey8@uga.edu with the subject line: Need Ride To Barn Hours.

In order to receive credit for attending barn hours, you MUST turn in your completed log sheet, come to the barn three times for 30 minutes (over a two week period), and turn in your journal entries.

Journaling

For each visit to the barn you will be asked to answer a few questions about your time spent at the barn. At the lab where the second skills tests are preformed, please bring your journal entries, TYPED. The questions you should address are:

- Do you feel that your ability to perform your assigned skill has improved?
- Do you feel that the time spent at barn hours was useful?
- If you were given a choice to extend lab hours for practice or work outside of lab time at barn hours, which would you prefer?
- Do you feel that spending time with your assigned horse has played any role in your confidence level in relation to your assigned skill? To working with horses in general?
- Any other thoughts that you would like to share.

Barn Hours Log Sheet

Name: _____

Class: _____

* * * * * * * * * * * *

Date:

Time In:

Time Out:

Initial:

* * * * * * * * * * * *

Date:

Time In:

Time Out:

Initial:

* * * * * * * * * * * *

Date:

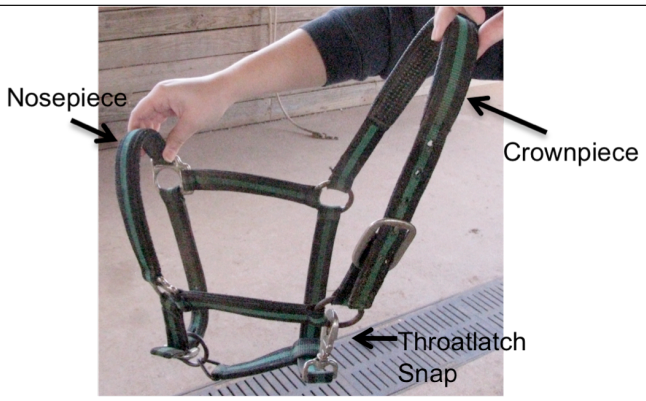
Time In:

Time Out:

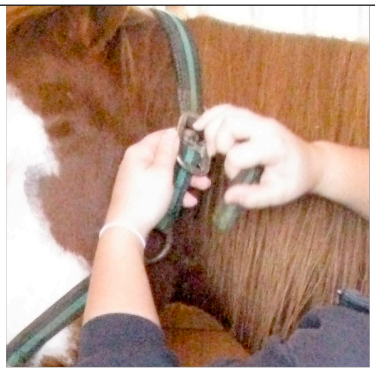
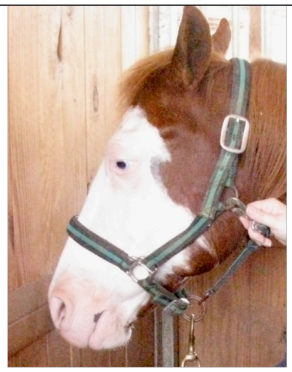
Initial:

APPENDIX I: HALTERING HANDOUT

HANDOUT SKILL A: HALTERING A HORSE

<table>
<tr><td>1. Check that throat snap and crown piece are unsecured.</td><td> 
</td></tr>
<tr><td>2. Hold halter at the bridge of the nosepiece with your left hand and the leadline in both the left and right hands in front of your body. Make sure the leadline is NEVER coiled around your hand or dragging on the ground.</td><td> 
 </td></tr>
<tr><td colspan="2">3. Approach horse from the side, in line with the point of balance.</td></tr>
</table>

4. Keeping your hands on the horse, safely move to the left shoulder of the horse.	
5. Place your leadline around the horses' neck by placing the leadline over the crest. *This is done so you can gain control of the horse before placing the halter on the horse.	
6. Put the horses' nose in the halter making sure the halter is correctly oriented.	
7. Using your right hand, reach over the horses' neck and find the crownpiece. Gently bring the crownpiece over the horses' poll and behind their ears.	

8. Fasten the crown piece. Fasten the throatlatch.	 
9. Bring the lead line over the horses' neck so that all of the line is on the left side of the horse. 10. Hold the line by placing your right hand a few inches below the snap and holding the slack of the line in your left hand. *Make sure the slack IS NOT coiled around your hand or dragging on the ground. 11. End by standing at the horses shoulder, holding the leadline as described above, and facing the same direction as the horse.	

HANDOUT SKILL B: APPLYING A STANDING PILLOW WRAP

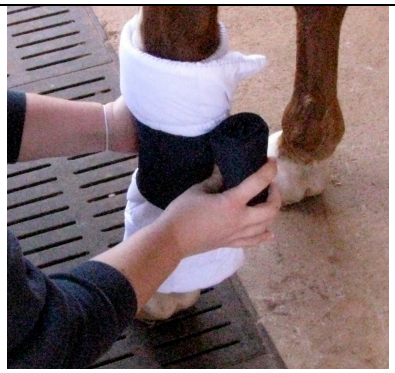
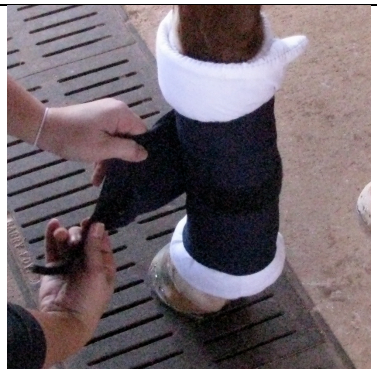
*Wraps will be given to student already prepared the appropriate way.

*Horse will be secured on cross ties.

Before you begin: Gather materials needed (pillow wrap and standing wrap).

1. Approach the horse in a safe manner; from the side in the horses' line of sight and placing a hand on the horse to alert him/her of your presence.
2. Keeping your hand on the horse at all times move to the leg of the horse you are assigned to wrap. Make sure you do not walk under the horses' neck!
3. Position yourself by the assigned leg in a safe manner. Squatting facing the side of the horse with hands outstretched toward the leg. NEVER sit on the ground when applying a wrap!

4. Apply the pillow wrap starting at the front of the leg and wrapping to the outside of the horse and in the direction of head to tail. The pillow wrap should wrap around the cannon bone but not be constrictive to the knee or fetlock.

5. Once the pillow wrap is in place apply the standing wrap in the same direction. The loose end of the standing wrap should be tucked under the outermost layer of the pillow wrap and begin in the middle of the cannon bone.	
6. Continue wrapping the standing wrap down to the bottom of the cannon bone and then back up to the top of the cannon and back to the origin of the wrap. When wrapping, apply pressure to the wrap ONLY over the front of the cannon, NOT along the tendon side of the leg.	
7. Secure wrap with Velcro fastening.	
8. Check the wrap for even pressure by looking to see if the wrap is smooth, feeling is the wrap is smooth, and tapping along the side of the wrap (if the same sound is heard all the way down the wrap, the tension is even).	

APPENDIX K: HALTERING RUBRIC

Skills Test Rubrics

BASIC SKILL: HALTERING A HORSE

Points awarded	Action
0	Skill not attempted
+1	Student approached horse
+1	Student approached correctly; from either side at the point of balance and moved to the left side in a safe manner.
+1	Lead line placed around the horse's neck from left side over crest
+1	Nose of horse is inserted into the proper end of the halter with noseband oriented properly
+1	Crownpiece brought over horse's poll by the student reaching over the crest with their right hand and bringing the strap over
+1	Fastenings secured correctly
+1	Student finishes skill by standing at the shoulder and holding the lead line correctly (near hand at the clip end and far hand holding the slack *safely…not wrapped around their hand*)
+1	Student finished this skill standing on the left side of the horse

*Total number of points allowed is 8 points for both skills

*Skill will be timed. Timer starts when the student takes their first step towards the horse and ends when participant says END.

*Heart monitors will be attached to both the participant and the horse to gage comfort levels of both equine and human during the testing scenario.

*Students will use the same horse in both the initial and final test. (A different horse may be assigned to a participant for either the first or second skill, but not within test days of a certain skill.) Those allowed outside practice time will also practice on their assigned testing horse only.

APPENDIX L: WRAPPING RUBRIC

ADVANCED SKILL: APPLYING A STANDING PILLOW WRAP

Points awarded	Action
0	Skill not attempted
+1	Student approached horse
+1	Student approached correctly; in a safe manner keeping one hand on the horse at all times when walking to the assigned leg to bandage and not walking under the neck of the horse
+1	Student is in the proper position for applying bandage (not sitting on the ground, but instead in a squatting position with hands in front of their body
+1	Pillow wrap is applied correctly, wrapping around the cannon bone from inside of the leg toward the outside of the leg and the tail end of the horse
+1	Standing wrap started correctly, end of wrap is tucked under the outermost layer of the pillow wrap and the direction of the wrapping continues in the correct direction
+1	Tension from the standing wrap is applied to the bone side of the lower leg, not on the tendon side of the leg.
+1	Standing wrap is correctly fastened by Velcro fastening
+1	Student finishes skill by checking that wrap is smooth and of consistent pressure

*Total number of points allowed is 8 points for both skills

*Skill will be timed. Timer starts when the student takes their first step towards the horse and ends when participant says END.

*Heart monitors will be attached to both the participant and the horse to gage comfort levels of both equine and human during the testing scenario.

*Students will use the same horse in both the initial and final test. (A different horse may be assigned to a participant for either the first or second skill, but not within test days of a certain skill.) Those allowed outside practice time will also practice on their assigned testing horse only.

APPENDIX M: FINAL SKILLS TEST RUBRIC

Skills Test Rubric: Final Skills Test

One rubric will be used for both skills. Instead of numerical scoring, the goal of this activity is to assess skill retention.

Skills test three will follow the same format as previous tests with the exception of heart rate monitor use.

Time limits are applied to third test:

- **45 seconds, Haltering**
- **2 minutes 30 seconds, Wrapping**

N- Student did not attempt skill
N+ Student attempted skill, but did not complete skill
Y- Student completed skill with errors
Y+ Student completed skill without errors