

Evaluating Student Satisfaction with Remote Learning in a Veterinary School

By

Sara-Louise Roberts Newcomer

A thesis submitted to the Graduate Faculty of Auburn University
in partial fulfillment of the requirements for the Degree of
Master of Science

Auburn, Alabama

August 7, 2021

Keywords: remote learning, veterinary medicine, adult learner

Copyright 2021 by Sara-Louise Roberts Newcomer

Approved by

Jane Teel, Chair and Associate Clinical Professor of Educational Foundations, Leadership and
Technology

James Witte, Co-Chair and Professor of Educational Foundations, Leadership, and Technology

Maria Witte, Professor of Educational Foundations, Leadership, and Technology

Abstract

Adult learners make up the entire population of veterinary students. Despite this, veterinary college curricula are generally only offered through face-to-face lectures and laboratories. As a result of a global pandemic, veterinary curricula throughout the United States were required to utilize available technology and the internet to transition all classes from face-to-face to remote learning in the middle of the Spring 2020 semester. With this necessary response to an emergent situation, both veterinary educators and veterinary students were forced to consider the role and opportunity for remote learning (synchronous and asynchronous delivery) in the DVM curriculum. This study explored the potential impact that remote learning opportunities had on veterinary students' satisfaction. The sample population consisted of a convenience sample of 245 veterinary students from one Southeastern veterinary college who were asked to complete the end-of-semester course evaluation, which included five additional statements pertaining to remote learning. This study was performed to hopefully provide insight into possible changes that could be made in the future as veterinary medical education seeks to further utilize advancing technology and increase flexibility in learning while still providing a high-quality professional education. Measures of dispersion and frequency were used to analyze the data. For both groups, the overall Likert-type score was $M= 2.93$ ($SD = 1.69$) for the first remote learning statement which demonstrated that the combined mean of both groups slightly disagreed to preferring streaming live lectures over watching recorded lectures. Regarding the remaining four remote learning statements, responses indicated overall agreement from both groups; these statements pertained to length of lecture, support for remote learning and available resources for remote learning.

Acknowledgements

I am forever grateful to my husband, BJ. Thanks for being my best encourager, safest place to ask all the questions, in-house resource and loyal steadfast companion. For all the times that you reminded me I could do this, and for seeing me all the way through it. We are definitely better together.

I am also grateful to my Dad, who modeled life and veterinary medicine to me from my earliest days, but also kept a passion for trying something new even to the very end of his life. Though he is not here to celebrate this milestone with me, I know he has a good seat from where he continues to watch me. To my Mom and my sweet brother Rob, thanks for reminding me of the skills, courage and hard work that being a good educator requires. I loved the conversations I was able to have with both of you throughout this degree and look forward to continuing those conversations in the future. Thanks, too, for loving me so well.

Dr. Jane Teel—thank you for being an incredible mentor and patient advisor. Your willingness to come alongside me through this Masters, in the coursework, in giving me feedback for my own courses, and in the details of completing my thesis. I know I would never have made it through without you. Thank you for being passionate and a joy to work with.

Dr. James Witte and Dr. Maria Witte. Witte, you will always hold a special place in my heart for picking on me that first night in class because everything you did reminded me of my Daddy. There's no sweeter compliment I can give, than to say you remind me of him and for that I am thankful. And Dr. Witte, my first conversation with you about pursuing a graduate degree was the open door to kindness and encouragement that I desperately needed at that time. Each conversation I've ever had with you has always been that same way. I am grateful to you both.

Table of Contents

| | |
|---|----|
| Abstract..... | 2 |
| Acknowledgements..... | 3 |
| List of Tables | 7 |
| List of Figures..... | 8 |
| Chapter 1: Introduction..... | 9 |
| Statement of the Research Problem | 10 |
| Purpose of the Study | 11 |
| Significance of the Study | 11 |
| Research Questions | 12 |
| Assumptions of the Study | 12 |
| Limitations of the Study..... | 12 |
| Definition of Terms..... | 13 |
| Chapter 2: Literature Review..... | 14 |
| Purpose of the Study | 14 |
| Significance of the Study | 14 |
| Research Questions | 15 |
| Distance Education..... | 20 |
| Health Professions and Blended Learning | 23 |
| <i>Nursing Education</i> | 23 |
| <i>Pharmacy Education</i> | 26 |

| | |
|---|----|
| <i>Medical Education</i> | 28 |
| Veterinary Medical Education | 32 |
| Chapter 3: Methods..... | 37 |
| Purpose of the Study | 37 |
| Significance of the Study | 37 |
| Research Questions | 37 |
| Research Design | 38 |
| Population and Sample..... | 38 |
| Instrumentation..... | 39 |
| Data Collection..... | 40 |
| Data Analysis | 41 |
| Summary | 41 |
| Chapter 4: Findings..... | 42 |
| Purpose of the Study | 42 |
| Significance of the Study | 42 |
| Research Questions | 42 |
| Description of the Sample | 43 |
| Description of the Survey Results..... | 43 |
| Summary of the Findings | 54 |
| Chapter 5: Summary, Implications, Limitations and Recommendations | 58 |
| Purpose of the Study | 58 |
| Significance of the Study | 58 |

| | |
|---|----|
| Research Questions | 59 |
| Summary | 59 |
| Implications..... | 59 |
| Limitations | 61 |
| Recommendations for Future Study..... | 62 |
| References..... | 64 |
| Appendix A: IRB approval and application..... | 71 |
| Appendix B: End-of-Semester Evaluation..... | 84 |

List of Tables

| | |
|---|----|
| Table 1- Number and Percentage of Respondents' Likert-type scores for RL Statement 1, Groups 1 and 2..... | 45 |
| Table 2- Number and Percentage of Respondents' Likert-type scores for RL Statement 2, Groups 1 and 2..... | 47 |
| Table 3- Number and Percentage of Respondents' Likert-type scores for RL Statement 3, Groups 1 and 2..... | 49 |
| Table 4- Number and Percentage of Respondents' Likert-type scores for RL Statement 4, Groups 1 and 2..... | 51 |
| Table 5- Number and Percentage of Respondents' Likert-type scores for RL Statement 5, Groups 1 and 2..... | 53 |

List of Figures

| | |
|--|----|
| Figure 1- Mean Likert-type Score for Remote Learning (RL) Statements..... | 43 |
| Figure 2- Frequency by Group for Remote Learning (RL) Statement 1..... | 44 |
| Figure 3- Frequency by Group for Remote Learning (RL) Statement 2..... | 46 |
| Figure 4- Frequency by Group for Remote Learning (RL) Statement 3..... | 48 |
| Figure 5- Frequency by Group for Remote Learning (RL) Statement 4..... | 50 |
| Figure 6- Frequency by Group for Remote Learning (RL) Statement 5..... | 52 |

Chapter 1: Introduction

The first American veterinary college started in 1879 and since that time, twenty-nine others have been established for a total of thirty veterinary colleges. As veterinary medicine has developed and advanced, so has the desire and necessity for veterinary educators to effectively present knowledge to students during their four years of education earning a Doctor of Veterinary Medicine (DVM). At the same time, as technology has progressed, higher education has adapted to these changes which have also been integrated into veterinary medicine curricula as an adjunctive means of facilitating veterinary students' learning. Some examples utilized include recorded lectures (such as Panopto), embedded videos of cases, classroom response systems (such as PollEverywhere and Turning Point) and learning management platforms (such as Canvas) which serve to consolidate course materials, assignments, and grades into one online and accessible location for students and educators. The uses of these tools have been progressive in the classroom. Veterinary curricula have continued to be delivered primarily face-to-face in traditional lecture and lab settings.

Outside of the realm of professional schools, the use of technology, the internet, and a greater appreciation for the needs of the adult learner led to courses and entire curricula through distance learning platforms in higher education significantly expanding in availability. Distance education programs were designed to allow the learner control and access for when their schedule allowed for their most productive learning. The platform was asynchronous meaning the instruction was not tied to a specific class time or simultaneous between the learners and instructor. This therefore necessitated self-direction and internal motivation from the student, while it also facilitated learning to be achieved from any physical location with internet access. Despite distance education programs having great success in higher education, there have been

few publications in the literature reflecting the use and impact of this type of program being incorporated into veterinary medicine curricula.

According to a survey completed by Dhein (2007), though distance education has not been utilized, remote learning with video, web, or audio conferencing has been a successful component of veterinary curricula throughout the United States. With the growth of veterinary programs, collaboration was necessary to fill in gaps in the curriculum or to provide expertise in emerging medical topics (Dhein, 2007). With that, video conferencing technology became one of the earliest adopted modalities of remote learning for veterinary schools, providing education between instructors and students that were geographically distanced (Dhein, 2007).

The challenge remained, that the shift to variations outside of the traditional classroom environment were generally motivated by a need to provide a complete curriculum, as opposed to providing flexibility in the education focused on a way to meet the needs of the adult learner. The question that has not been answered is where veterinary curricula can be altered to incorporate a more learner-centered approach? As a result of a global pandemic, entire veterinary curricula were forced to utilize remote learning with large portions of courses provided through synchronous delivery platforms utilizing video portal systems. While the abrupt change was required, there is room to consider how this seemingly temporary shift could impact veterinary medicine curricula? Rather than a rapid return to the way things were, there is great potential for the challenges of the present to become opportunities for a progression towards lasting change in the future.

Statement of the Research Problem

Adult learners make up the entire population of veterinary students. Despite this, veterinary college curricula are generally only offered through face-to-face lectures and

laboratories. Additionally, the programs offer little flexibility for the adult learner with stipulations such as mandatory attendance and as many as thirty-five to forty hours of lecture or lab, five days a week, for fourteen to sixteen weeks in a semester. As a result of a global pandemic, veterinary curricula throughout the United States were required to utilize available technology and the internet to transition all classes from face-to-face to remote learning in the middle of the Spring 2020 semester. With this necessary response to an emergent situation, both veterinary educators and veterinary students were forced to consider the role and opportunity for remote learning (synchronous and asynchronous delivery) in the DVM curriculum. Moving forward, the question remains as to the perceptions and satisfaction of veterinary students, as it relates directly to their opportunity to learn via remote education platforms for the remainder of the semester. Additionally, as the effects of the pandemic continue to be problematic for the foreseeable future, it further validates the need of appreciating students' perspectives as adult learners. As the need for change and adapting is continual, opportunity exists to adjust the veterinary curriculum in a way as to utilize advanced technology delivery platforms while factoring in what is most helpful to the students being educated.

Purpose of the Study

The purpose of the study was to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester. This study also examined student satisfaction when comparing two cohorts of students taught by remote learning during the same semester (semesters two and four in the curriculum).

Significance of the Study

This research examined satisfaction of veterinary students taught in a remote learning environment. The results can be used to increase awareness of perceptions of veterinary students

as adult learners, particularly since remote learning has not been widely used in veterinary college curricula. Additionally, the results of this study can also provide insight into possible changes that could be made in the future as veterinary medical education seeks to find ways to utilize available technology to increase flexibility in learning while still providing a high-quality education and factoring in the rising costs of the doctor of veterinary medicine (DVM) education.

Research Questions

This study addressed the following research questions:

1. What is the relationship, if any, between student satisfaction and course delivery method?
2. What is the relationship, if any, between student satisfaction and cohort (first-year veterinary students and second-year veterinary students) in remote learning?

Assumptions of the Study

The following assumptions were made:

1. Students responded honestly to the survey questions.
2. The end-of-semester evaluation used by the veterinary school is a valid instrument to determine the potential impact of remote learning in veterinary students' satisfaction.

Limitations of the Study

1. This study examined students at one veterinary school geographically located in the southeastern part of the United States; generalization beyond the institution within this study should be assumed with caution.

2. Surveys pertain to courses that were developed and started in a traditional, face-to-face educational environment but were required to be finished through remote learning as a result of a global pandemic.

Definition of Terms

The definition of terms provided in this study are presented below:

Adult learner—in terms of this research study, a male or female student pursuing a post-secondary education or graduate/professional education.

Remote Learning- in terms of this research study, the use of technology to provide content and instruction and to engage in dialogue between instructors and students, when the instructor and student are not in the same physical location.

Blended Learning- in terms of this research study, the integration of online and offline learning, utilizing either a synchronous platform, asynchronous platform, or a combination of the two, for the benefit of the learner.

Synchronous Platform- in terms of this research study, refers to real-time instructor led learning where all learners are receiving the information facilitated by the instructor simultaneously, via video conferencing technology

Asynchronous Platform- in terms of this research study, refers to learning that allows learners to view instructional materials at any time they choose and does not include a live video lecture

Chapter 2: Literature Review

As the subject of this project is veterinary students, the literature review will first focus on the subject and attributes of adult learners in an effort to establish a comprehensive background of how and why this population fits into the category of adult learner. Then, some of the adult learning theories in the literature will be reviewed so as to better understand what is already known in the literature historically and how those theories still readily apply to veterinary students. Distance education will also be reviewed since it will be this approach to education with the ongoing development and integration of technology that eventually led to opportunities for blended learning approaches. Lastly, the literature will be considered in the health professions, specifically nursing, pharmacy, and medical education with a critical analysis of publications pertaining directly to blended learning studies. This review will conclude with considering the limited studies pertaining to blended learning in veterinary medical education.

Purpose of the Study

The purpose of the study was to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester. This study also examined student satisfaction when comparing two cohorts of students taught by remote learning during the same semester (semesters two and four in the curriculum).

Significance of the Study

This research examined satisfaction of veterinary students taught in a remote learning environment. The results can be used to increase awareness of perceptions of veterinary students as adult learners, particularly since remote learning has not been widely used in veterinary college curricula. Additionally, the results of this study can also provide insight into possible changes that could be made in the future as veterinary medical education seeks to find ways to

utilize available technology to increase flexibility in learning while still providing a high-quality education and factoring in the rising costs of the doctor of veterinary medicine (DVM) education.

Research Questions

This study addressed the following research questions:

1. What is the relationship, if any, between student satisfaction and course delivery method?
2. What is the relationship, if any, between student satisfaction and cohort (first-year veterinary students and second-year veterinary students) in remote learning?

Defining Adult Learners and Characteristics of Adult Learners

Malcolm Knowles is known as the father of andragogy, a term defined as the art and science of helping adults learn (Knowles et al., 1973/2005). Knowles' early attempts and publications on the concept of andragogy were based on its differences from pedagogy. "This is evident even in the subtitle of his 1970 edition of *The Modern Practice of Adult Education: Andragogy versus Pedagogy*" (Knowles et al., 1973/2005, p. 61). Pedagogy, by definition, meant the art and science of teaching children and this model assigns the teacher full responsibility for making all decisions about the learning. Even after World War I, as adult education programs were being initiated, the pedagogical model was used because it was the only model that teachers had (Knowles et al., 1973/2005). Knowles, then, was credited with popularizing the term and the concept of andragogy in the United States in 1968, although the term was first coined by German grammar teacher, Alexander Kapp in 1833 (Knowles, 1978). "Andragogy is based on the psychological definition of adult, which states that people become

adults psychologically when they arrive at a self-concept of being responsible for their own lives, of being self-directing” (Knowles, Holton, Swanson, (1973/2005), p. 64).

Knowles went on to develop six assumptions or characteristics that described adult learners. The original four assumptions were first published by Knowles in 1975. Two more assumptions were added later, with the fifth (motivation to learn) added in 1984 and the sixth (need to know) in 1989. The six assumptions are the following:

1. The adult learner has an independent self-concept and can direct his or her own learning
2. The adult learner has accumulated a reservoir of life experiences that is a rich resource for learning
3. The adult learner has a readiness to learn
4. The adult learner has an orientation to learning pertaining to immediate application
5. The adult learner is motivated to learn by internal rather than external factors
6. The adult learner has a need to know (Knowles et al., (1973/2005))

Knowles used these assumptions to guide the theory and development of the needs of an adult in an effort to differentiate their learning from that of a child. “He assumed that as people mature, they move along a continuum in areas that reflect each of these six assumptions, and that this movement is from a level of dependence and passivity toward greater levels of independence, initiative, and action,” (Boeve, 2012, p. 126). Merriam (2001) explained that for adult learning, the goal of the theory simply illustrates that adult learners should be involved in as many aspects of their education as possible and in the creation of a climate where they can most fruitfully learn. Cross (1980) described adult learners with the characteristics of being

achievement oriented, highly motivated, and relatively independent with special needs for flexible schedules.

Researchers Merriam and Caffarella (1999) described learning opportunities for adults and differentiated that although Knowles andragogical model of instruction was the “best-known learner-centered model of instruction” that it was more applied to informal arenas of learning and was not used a great deal in actual practice (p. 37). They argued that instructor-designed learning is what adults have come to expect in formal settings.

Another characteristic that is commonly known and researched among adult learners is that of being self-directed. Cyril Houle was an author and researcher who had an influence on self-directed learning by his first study published in 1961, *The Inquiring Mind*. Gordon (1993) describes Houle’s work as being foundational for motivational research in adult education. Houle (1961) developed a typology based on his study of 22 participants. Houle found that among his participants, there were three different types of continuing learners: goal-oriented, activity-oriented, and learning-oriented. Goal-oriented learners were those who sought education as a means of attaining a particular goal, such as a certificate or promotion. Those learners who were activity-oriented, participated for various reasons, all linked to the social contact that learning provided. For these learners, the focus was on the learning itself as opposed to the content (Houle, 1961). The third type of learner was the learning-oriented learners, who were significantly different from the other two groups, as they were moved chiefly by an intrinsic desire to know. For this group, they would be classically avid readers, join groups or classes for educational reasons and found learning to be an innately enjoyable experience resulting in it being a constant in their life (Houle, 1961).

Houle would go on to influence several of his graduate students, unintentionally, and one of those students was Allen Tough (Hiemstra, 1994). Tough's (1971) work on self-direction was published in *The Adult's Learning Projects* and built upon the work of his dissertation. Tough defined learning projects as

a series of related episodes, adding up to at least seven hours. In each episode, more than half of the person's total motivation is to gain and retain fairly clear knowledge or skill, or to produce some other lasting change in itself. (p. 7)

Because Tough's intentions were to encompass all adult learning, the learning projects he described include participation in common educational settings (such as the classroom), where someone else plans and often facilitates learning. However, in 68% of cases, the adult themselves planned their learning projects. By planning a learning project, Tough referred to the decision regarding the content, method, schedule and pace of learning episodes (Tough, 1971).

The seminal works of Houle and Tough, would be followed in the 70's by others that further defined and popularized self-directed learning. One of those would be another graduate student of Cy Houles, the more well-known theorist, Malcolm Knowles. Ross-Gordon et al. (2017) explained that Tough's initial work with learning projects served as the development and foundation of self-directed learning, where Knowles' focus would be the application and explication of self-directed learning. Knowles (1975a) described the self-directed learning process "in which learners take the initiative, with or without the help of others, diagnose their learning needs, formulate learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes" (p. 18). In his experience, learners tended to retain and make use of what they learned better through self-direction. Knowles also reasoned this led to an essential aspect of maturing in

developing the ability to take increasing responsibility for their lives (1975a). Knowles' last reason for this skill (self-direction) argued that without it, the learner would experience anxiety, frustration and often failure.

In 1975b, years after his initial work with andragogy, Knowles shifted his definition of andragogy saying that it was "gradually being changed to 'the art and science of helping maturing human beings learn'" (p. 87). He suggested andragogy is a process of learning on a continuum from teacher-directed learning (pedagogically oriented) to self-directed learning (andragogically oriented) and that the key assumptions were applicable to both children and adults in learning (Ross-Gordon et al., 2017). Cross (1981) further acknowledged that "we may no longer have a theory of adult learning but, rather a theory of instruction..." (p. 223).

While Knowles' theory of andragogy has been widely referenced and debated over the years, other adult learning theories have also contributed to the overall literature on learning theories. Similarly, to Knowles' second assumption on adult learners relating to their life experiences upon which they draw upon, Kolb's experiential learning theory encourages educators to approach adult learners differently because of experience being central to learning (Kolb, 1984). Kolb (1984) defined learning as "the process whereby knowledge is created through the transformation of experience" (p. 38). Kolb's theory is described as an experiential learning cycle with four different modes including (1) concrete experience (2) reflective observation (3) abstract conceptualization and (4) active experimentation (Kolb, 1984). Kolb argued that if learners are to be effective, they need each of these abilities, but because these learning abilities are in essence polar opposites (one cannot act and reflect at the same time), the learner must choose which set of learning abilities he or she will bring to bear in any specific learning situation (Kolb, 1984). Dale et al. (2008) described the repetition in Kolb's learning

cycle as being a model of the process involved in developing problem-solving skills. He argued that as the learner develops a theory, applies it to a real problem, evaluates the outcome, and subsequently refines their understanding, it is the experiential learning of real-life problems that supports the development of higher cognitive abilities (Dale et al., 2008).

Transformative Learning is another adult learning theory that has gained interest and popularity in the adult education setting, with the first work contributed to Jack Mezirow (Ross-Gordon et al., 2017). Mezirow's theory, like Knowles assumption about adult learners and Kolb's learning cycle, highlighted the significance of adults acquiring a coherent body of experience which impacts the learning process. Mezirow (1997) described adults as having a frame of reference, which is made up of the structures of assumptions through which we understand experiences. He initially described transformative learning as a process involving 10-steps to achieve perspective transformation. He theorized that an adult learner experiences a change in their perspective toward a specific circumstance or life experience and "when culture permits, the learner moves towards a frame of reference that is more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide actions (Mezirow, 2000, p. 8).

Distance Education

The first concepts of distance education are reported to have started in the 1700's, but this was primarily through correspondence. Harting and Earthal (2005) describe that in the 1990's, with the advent and increasing use of high-powered personal computers, broadband communication, and digital video, telecommunications-based education started to expand in widespread use. This type of distance education, dependent on technology and computer-mediated is similar to what we use today and is described by Sumner (2010), as the third

generation of distance education. It was also in the 1990's that a myriad of private and public universities began offering online undergraduate and graduate courses; these courses have since become a major educational component in many universities (Harting & Earthal, 2005). Much is written in the literature since the 1990's about the use of technology to support distance education and adult learning. The next advancement combining education and technology came after the second millennium, when web-based businesses developed an evolved set of functional capabilities labeled Web 2.0. (Trelease, 2016). Using Web 2.0 methods, learning management systems (LMSes) such as Blackboard were developed, which supported multiple courses uniformly at the institutional level. Trelease (2016) describes the use of these large webserver-based application suites to provide password-protected students and faculty access to multiple course features. LMSes have become the essential standard for core curriculum in most American universities and medical schools.

Motivations from the institutional perspective for distance education included the desire to provide education to those who were previously denied it, while also realizing the need for providing flexible, cost-effective learning opportunities. Institutions that have developed reasons for applying significant efforts into online education, generally fall into one of four broad categories: 1. Expanding access 2. Alleviating capacity constraints 3. Capitalizing on emerging market opportunities 4. Serving as a catalyst for institutional transformation (Volery and Lord, 2000).

But these motivations from the institution-side gradually led to institutions and researchers investigating the experience of the learner and seeking to combine aspects of online education with those students who were in a campus-based education, resulting in a blended learning experience (Ginns and Ellis, 2007). Blended learning is a term with many different

meanings and according to Oliver and Trigwell (2005) may be more appropriately called learning with blended pedagogies. This involves the integration of online and face-to-face (F2F) learning. The goal of a blended learning environment is to combine the best components of the F2F and online learning environments together, for the benefit of the student (Liu et al., 2016; Green et al, 2018). It is the integration of student-centered and teacher-centered, online and offline learning or simply the combination of synchronous and asynchronous learning (Vaughan, 2014).

It is important to note that within adult education and distance education, there is not an agreed upon definition of various modalities that are utilized. Some of the terms utilized include distance education, distance learning, online learning, online education, e-learning, remote learning, synchronous and asynchronous distance learning, and blended learning. Additionally, the term blended learning also has many different uses and definitions. For the remainder of this chapter, the review will focus on the literature pertaining to the understanding of a blended approach of asynchronous and synchronous, remote and face-to-face learning, combined.

An online learning environment provides benefits of increased flexibility and convenience in undergraduate students, graduate students, and professional students (Baran et al., 2009, Green et al., 2018; Khalil, et al., 2018; McKenna et al., 2020). Green et al. (2018) also describes an online learning environment providing greater reach to students in multiple locations. Additionally, “technology-driven strategies relate well to the learning styles of this digitally literate generation of students” (Khalil et al., 2018, p. 324). The asynchronous component, or on-demand access allows students to view it when they want thus reducing specific in-person course hours (Trelease, 2016). Chen and Jones (2007) also noted that one benefit of a blended learning environment might be to encourage students to use more resources

from the web and broaden their learning experience, whereas relying solely on classroom attendance leads to a more detached and passive participation in the traditional face-to-face classroom alone. Merriam & Bierema (2014), as cited in McKenna et al (2020), further explained that blended courses allow for the advantages of both modalities specifically pertaining to adult learning, “including direct-contact, real-time interaction, time for reflection on discussion responses, and the ability to share resources, which reflect foundational adult learning principles, such as andragogy and self-directed learning” (p. 139).

There is disagreement in the literature as to the cost-effectiveness of blended learning. Maloney et al (2015) describe it as cost-effective, while others argue that it is unclear if blended courses are less expensive than traditional courses (Trelease, 2016; Cook, 2014). One limitation agreed upon is the lack of student interactions, particularly in higher online content but a face-to-face component could provide the quality interaction, particularly for experiential learning (Khalil et al., 2018; Green et al., 2018).

Health Professions and Blended Learning

In an effort to search the literature involving a population with more similarities to veterinary students, health professions education programs were further considered including nursing, pharmacy, and medical education, regarding their use of blended learning modalities.

Nursing Education

Though the body of literature for nursing education using electronic means to deliver courses is rather extensive, most studies pertain directly to distance education. It has been suggested that the primary motivator for nursing programs to offer distance courses pertains directly to educational access according to several publications (Wells & Dellinger, (2011); Foronda & Lippincott, 2014; Scarbrough, 2015). Considering those courses offered through

distance or by means of technology online, the definition of online was a “course where most or all of the content is delivered online with typically no face-to-face meetings” but whether the instruction of the courses was asynchronous versus synchronous was not distinguished (Foronda & Lippincott, 2014, p.1). Foronda and Lippincott (2014) explained the advancement and sophistication of video conferencing over the decades of its use. Solutions through video conferencing for the benefit of all students at various remote locations included allowing for synchronous audio chat, sharing of a whiteboard and desktop, breakout sessions and polling of students. The authors proposed the argument that the interaction resulting from these advanced features could parallel, if not exceed the interaction from traditional lecture. Additionally, many of the products’ platforms have the ability for recording sessions, allowing students who cannot attend the opportunity to view or review the classes at their convenience (Foronda & Lippincott, 2014).

Wells and Dellinger (2011) compared three different delivery systems to determine if there was a perceived learning difference among graduate nursing students, based on their environment. The three sections of the same course included one group that was face-to-face located in the classroom (host-site on main campus), one group that was at a remote site interacting with the students and faculty in the classroom, and one group that was taught via internet only. Wells and Dellinger (2011) used the internet-only group (sample size of 25) and the video remote-site (sample size of 11) as the experimental groups and the host-site on main campus (sample size of 13) as the control group. A Learner-Interaction Tool, adapted from instruments used by Sherry, Fulford, and Zhang was utilized to measure learner-instructor interaction, learner-learner interaction, perceived learning, and learner-system interaction (Wells & Dellinger, 2011). Results showed that no significant difference was found in final course

grades, with average course grade for students enrolled in the host and remote sites being 85.4 and average grade for internet students being 83.6. This study showed that students did not perceive a difference in learning based on the environment. Based on a summary of the regression analysis performed, none of the two-way comparisons for the three types of learning environments had a significant effect on perceived learning (Wells & Dellinger, 2011). They did find a significant influence on perceived learning based on the interaction between the instructor and the learner ($p=.005$), placing greater emphasis on the faculty in the learning process as opposed to the modality (Wells & Dellinger, 2011).

Another study looked at implementation of a hybrid curriculum with licensed practical nurse (LPN) certificate level program students. The authors cited a lack of data concerning entry-level nursing students and stated a concern that this population specifically could need the structure and support of the traditional classroom in order to acclimate to the rigor of the nursing courses (Robinia et al., 2012). The results of the study demonstrated that certificate level students in a hybrid environment (50% face-to-face, 50% online) maintained stable learning outcomes, had increased overall satisfaction and decreased attrition rates. It was also reported that students' satisfaction varied in that some strongly preferred a total face-to-face teaching experience while others appreciated the online work due to the flexibility and independence that it facilitated (Robinia et al., 2012).

Another work involving nurses in a master's level certificate program looked at the use of a video conferencing platform called Collaborate in conjunction with four online courses over two semesters (Foronda & Lippincott, 2014). The data suggested that students' experiences related to five different categories including enjoyment, flexibility and convenience, increased interaction, comparable or better than face-to-face, and minor technological issues. This study

supported the use of video conferencing to teach master's level nursing students (Foronda & Lippincott, 2014).

Pharmacy Education

Review of the literature shows limited sources pertaining to the overall success of distance-learning programs for the Doctor of Pharmacy program. Several studies (Wade et al., 1999; Chisholm et al., 2000; MacLaughlin et al., 2004; Ried & McKenzie, 2004; Steinberg & Morin, 2011) suggest that student performance was not adversely affected when they were taught via interactive video conferencing (IVC) on a remote satellite campus. Wade et al. (1999) assessed student performance in an advanced pharmacokinetics course taught three consecutive years, by three methods of instructional delivery. The first year the course was taught by instructors present in the classroom for all lectures, in year two one-half of the lectures were given by distance learning (utilizing interactive video conferencing), and in year three all lectures were given by distance learning. Student performance was determined by three written examinations throughout the course for each study year. The results regarding final course grades demonstrated no statistical difference over the three-year study period (Wade et al., 1999).

Steinberg and Morin (2011) compared academic performance of students in a pharmacotherapeutics course sequence taught synchronously on two campuses using distance education technology. For the PharmD program, instructors at the main campus (Worcester campus) teach a class of approximately 200 students, while video conferencing software allows a class of approximately 55 students to receive the same material synchronously on a satellite campus (Manchester campus). The results showed there was no significant difference between final course grades earned by students on the Worcester campus (mean 77.6%) and those earned by students on the Manchester campus (mean = 77.6%) (Steinberg & Morin, 2011).

Klibanov et al. (2018) considered synchronous delivery to two groups of students in one pharmacy program on Infectious Diseases Pharmacotherapy course (81 on main campus and 12 on distance campus), with those on the satellite campus being taught via synchronous IVC to facilitate interaction with the instructor. Unlike other studies, Klibanov et al. (2018) showed that students on the distance campus had overall course grades that were statistically significantly lower compared with students on the main campus (81.5% vs. 86.9%). At the same time, students on both campuses were generally satisfied with the course, although main campus students were more likely to feel that they succeeded in the course based on a post-course student perceptions survey (Klibanov et al., 2018). The authors noted that previous studies demonstrating students' performance in pharmacy curriculum not being adversely affected by distance education were not uniform in their design with notable differences, but were also performed over fifteen years ago, when technology was not as advanced as it is today (Klibanov et al., 2018). Additionally, none of the published studies were performed in an Infectious Diseases Pharmacotherapy course.

Auburn University's Harrison School of Pharmacy developed and implemented a pharmacy program at a satellite campus in Mobile, AL utilizing a course recording system that allowed course lectures to be viewed both live and on-demand through streaming (Fox et al., 2011). The recording system provided a multi-use platform for students' educational needs including being a back-up if the live system malfunctioned and also for rewatching the recordings for review and study purposes. The study in particular looked at two different cohorts of students and compared their opinions pertaining to the technology and its effectiveness. Mann-Whitney U tests were conducted to examine differences between student perceptions on the two campuses, and also to examine differences between the class of 2011 and the class of

2013 during their respective P1 years (Fox et al., 2011). The results showed that for both classes (Drug and Diseases I and Patient-Centered Skills), use of the recording system as a substitute for attending class and as a review tool showed statistically significant differences between the two cohorts. Fox et al., (2011) described that for the 2013 cohort, 63.6% used the software three or more times a week (as opposed to attending class) compared to none in the 2011 cohort, for the Drug and Diseases course. Furthermore, 90% of the P1 class of 2013 respondents indicated they used the recording system in place of attending class (three or more times a week) for the Patient-Centered Skills class (Fox et al, 2011). Additionally, there was also a significant difference between 2013 cohort at the Auburn campus and the satellite campus. Auburn students (2013, P1) were more likely to watch a recording three or more times a week (68%) instead of attending class on campus, compared to those on the satellite campus (41%). The authors hypothesized that one reason could be that the larger class size on the Auburn campus may have explained the difference in attendance (Fox et al., 2011).

Medical Education

Review of the literature of medical education acknowledges a shift from traditional forms of teaching to utilizing other forms of media to provide online, electronic, or distance forms of learning (O’Doherty et al., 2018). As with other health professions, this has been a gradual and consistent process over a number of decades. Within the health professions, medical graduates in particular faced the expectation and need to remain current in their skills and knowledge, amidst a rapidly growing body of information. Additionally, according to O’Doherty et al. (2018) medical graduates needed to be “‘digitally literate’ having the ability to use digital technology, communication tools or networks to locate, evaluate, use and create information” (p. 2). The concept of being digitally literate provided yet another opportunity and motivation for

medical educators to integrate online learning strategies, as they identified their crucial role in guiding and supporting the effective use of technology for learning and future success of medical students (O'Doherty et al., 2018).

Medical education has routinely used two different terms in the literature: e-learning and web-based learning. Both of these terms serve as umbrella terms that encompass various uses of the internet and technology for educational purposes. Ruiz, Mintzer and Leipzig (2006) further clarified that e-learning subsumes both distance learning and computer-assisted instruction. Distance learning is traditionally used to describe instruction delivered to learners at a remote site and computer-assisted instruction is learning that uses computers to aid in the delivery of multi-media packages for learning and teaching (Ruiz et al., 2006). Within e-learning, the authors explain synchronous delivery as real-time instructor led e-learning where all learners are receiving the information facilitated by the instructor simultaneously. In contrast, asynchronous delivery is when the transmission and receipt of information does not occur simultaneously and the learners are responsible for their own pacing, self-instruction and learning (Ruiz et al., 2006). Both of these means of content delivery can utilize video conferencing, as well as a variety of other methods and still be considered e-learning. Ruiz et al. (2006) clarified that from the student perspective, they did not see e-learning as replacing traditional instructor-led training but as a complement to it, forming a blended-learning strategy. At the same time, they also posited that from the educator side, e-learning integration would transform educators' roles. They would be facilitators of learning as opposed to distributors of content, shifting the learning environment for medical students towards application of adult learning theory (Ruiz et al., 2006).

Regarding the use of blended learning in medical education, in 2006, Kim proposed three e-learning modalities that had great potential for medical training in the future. Those modalities

included: simulation technology, synchronous learning delivery, and web-based or video conferencing for standardized patient-based training. With synchronous learning delivery, many benefits were noted including fostering peer-to-peer feedback and the ability for the recordings to be archived for later access by learners (Kim, 2006). The recommendation included further study to determine how best to use the ongoing advancement of technology and how to deploy effective e-learning strategies.

A meta-analysis was conducted looking at the effectiveness of blended learning in the health professions and considered 56 eligible articles (Liu et al., 2016). The definition of blended learning utilized was a combination of face-to-face learning and asynchronous or synchronous e-learning. The results demonstrated that blended learning could have positive effect on knowledge acquisition across a wide range of learners and disciplines directly related to health professions (Liu et al., 2016). Additionally, the authors did note possible explanations for this including giving students the ability to review electronic materials as often as needed and at their own pace. The positive effect on blended learning when compared with e-learning (non-blended) kept learners more involved resulting in them being less likely to experience feelings of isolation (Liu et al., 2016). There was significant heterogeneity, as a result of great variation in how blended courses were set-up which could also result in different effects, depending on the method of the blended learning.

Another study looked at a medical school that used a blended approach combining in-person didactic training in combination with asynchronous vodcasts (video podcasts) (Pettit et al., 2017). The aim of the study was to consider student preferences for vodcasts comparing students who were at the campus, and those who were spread out at community health centers around the country. An original survey was developed based on the authors review of the

multimedia learning literature and items were developed to investigate domains related to learning, motivation, and instructional design (Pettit et al., 2017). A total of 221 respondents completed the survey across three cohorts of medical students. The results showed that the most highly valued attributes for the vodcasts for students in the blended learning environment were features that decreased their time commitment including user-enabled speed and the ability to play it back for study purposes (Pettit et al., 2017).

Finally, Maloney et al. (2015) describe the discrepancy in the literature on the cost and value of technological innovations in education, with some studies supporting its cost-effectiveness and others indicating costs are higher as a result of increased resource development and need for technological support. The authors' study aimed to compare the cost-effectiveness of a face-to-face approach compared to a blended learning approach for evidence-based medicine (EBM) training within a medical program. The economic evaluation was conducted as part of a randomized controlled trial (RCT) involving multiple campuses (Maloney et al., 2015). In the trial, participants were third-year medical students and a total of 497 students were randomized to receive EBM teaching via face-to-face (F2F) approach or the blended learning approach (BL). For this study model, the BL component included an in-person workshop and online activities involving a YouTube channel and an online University library guide. The analysis for the trial considered the student competency in EBM as measured one month after the teaching activities using a validated Berlin questionnaire (Maloney et al., 2015). The authors then considered the cost-effectiveness for each course delivery by determining the quality of students' education with each method (QASE). The QASE formula was equal to number of students educated x the groups' average rating on the Berlin questionnaire (Maloney et al., 2015). Maloney et al. (2015) demonstrated in the results that the BL method was less costly and more effective to operate than

the F2F approach. Specifically, to operate the BL model, there is a cost saving of \$1.10 per student per increase in QASE above the QASE of the F2F method. Therefore, there is an incremental cost-effectiveness ratio indicated that it costs 24% less to educate a student to the same level of EBM competency via a blended learning approach, not excluding transition costs. Maloney et al. (2015) note the transition costs are to be expected in the first three years, but a break-even point is achieved within its third iteration; and, therefore, relative savings are noted in subsequent years.

Veterinary Medical Education

Blended learning within adult education is a subject that has been utilized for many years and scholarship around the subject is extensive in all levels of undergraduate and graduate education. Despite this, the literature is comparatively recent for veterinary medicine and publications are limited, particularly involving blended learning using technology for a synchronous or asynchronous delivery component.

The early adopters of technology-enhanced education for veterinary medicine provided through distance education had the intended audience of veterinarians in practice (for continuing education purposes) and veterinary technicians (for training or certificate programs) (Acor, 2005; Dhein, 2007a). To further assess the extent to which distant education using video conferencing, web conferencing, and other technologies was used at colleges of veterinary medicine, Dhein (2007a) created a survey and distributed it through two lists. Those lists were VetEdTech (created at Washington State University in 2005, to encourage discussion across schools on educational technology) and the Associate Deans list of the American Association of Veterinary Medical Colleges (AAVMC). Dhein (2007a) described that the use of technology in veterinary curricula was primarily used to provide adjunctive materials to lectures and laboratories on-site.

Veterinary medicine had been much slower in utilizing technology to educate veterinary students in remote locations in relation to the instructors. The survey highlighted the current perspectives on the use of distance education in veterinary curricula throughout the veterinary schools associated with the AAVMC. Survey results confirmed that twenty-one veterinary schools were utilizing either video conferencing or web conferencing platforms (or both) for synchronous education in a limited number of core credit hours in their curricula (Dhein, 2007a). Motivations for use of these modalities included the need to meet increasing demand for training in topics provided by a small number of educators, to fill curricular gaps, and to reach students when they were off campus at remote sites (Dhein, 2007a). The author further argued for a reevaluation of how veterinary schools collaborated, particularly on the development and use of technology-based programs.

Dhein (2007b) further reviewed web conferencing at one veterinary school, with students being taught in two different core courses as a result of a lack of faculty members in those disciplines available to teach the courses on-site. Additionally, web conferencing was also used to provide a limited number of hours of instruction in two different elective courses. The use of the term web conferencing refers to a synchronous meeting held over the internet, typically with geographically dispersed participants using their own computers (Dhein, 2007b). Dhein (2007b) described the set-up for the core courses came as a result of attempting to use a limited number of licenses for the software (26 licenses) to teach 30 lectures in two different courses for a class of 96 students. The class of 96 students was split into two groups, half assigned to the multimedia computer laboratory and the other half to an adjacent conventional classroom to which the presentation was broadcast; after several lectures, students self-selected the location in which they viewed the lectures (Dhein, 2007b). Comparing the two different methods of

distribution, the students using the computer monitors had the advantage of up-close high-resolution images, but a significant disadvantage was that since the computers were dummy terminals the students had no ability to interact with the instructor during lectures through text messaging or other means.

For the smaller elective courses, Dhein (2007b) described the method of distribution was to install the licenses on 20 computers in the student laboratory and use an in-house Net Support School to push the lecture to the other 36 computers. Communication with the instructor was encouraged during the sessions by asking questions through the computers enabled with the licensed program. For both core and elective courses, a voluntary online evaluation was distributed to the students who participated in the courses to determine overall responses based on their experience. Survey results demonstrated that those veterinary students in the core classes were less satisfied than those in the elective courses, overall. Of the 73 respondents for the core courses, only 31% agreed that the web conference technology was an appropriate medium for conducting the sessions, while 27% and 11% disagreed and strongly disagreed, respectively to the same question. Reasons included that students had less opportunity to interact with the instructors during the sessions and also preferred having an instructor in the classroom. Additionally, students frequently commented that hands-on experiences were needed for the core courses (Dhein, 2007b).

For the evaluation of the elective courses, 53 respondents completed the evaluation. Of those, 26% and 51% strongly agreed and agreed, respectively, that the technology was an appropriate medium for conducting the sessions. Additionally, the image quality was rated the same as in a face-to-face classroom by 67% of participants in the core lectures and 81% of participants in elective lectures (Dhein, 2007b). The author concluded that the degree of

satisfaction with web conferencing varied with expectations of the audience, the number and magnitude of technical problems experienced, and the degree of interactivity available to participants. Even still, the author posited that web conference technology held great promise as an efficient method to enhance veterinary curricula (Dhein, 2007b).

In contrast at another veterinary school, Sims et al. (2007) surveyed veterinary students with pre- and post-surveys regarding two courses also offered through video conferencing, in an attempt to solicit initial impressions and comfort levels with video conferencing as a means of teaching the courses. The number of respondents completing both the pre-and post-course assessment was 64 for the first course. 50% of the students reported that the technology used in the course had at least some adverse impact on their learning while 26% reported no adverse impact, and 20% reported a positive impact on learning from the technology (Sims et al., 2007). With respect to the importance of the instructor being physically present in the classroom, 84% agreed or strongly agreed prior to beginning the course, whereas only 59% agreed or strongly agreed at the conclusion of the course resulting in the percentage going down significantly after taking the courses (post-survey results). Additionally, 39% of students surveyed said they were receptive to video conferencing as a means of delivering an entire course from another school (Sims et al., 2007). For the second course, 44 students completed the surveys pre-and post-course. Of those respondents, 89% had a favorable expectation of the course, however only 36% of students believed that the technology of the course had a positive effect on learning, compared with 30% who felt it had an adverse effect (Sims et al., 2007). Sims et al. (2007) summarized the majority of positive comments related to educational opportunities of access to faculty and course content not provided at their institution. Negative comments related to poor technical quality, inability to see diagrams, and ease with which students could “tune out” during lectures.

Conclusion

This literature review has provided a review of definitions and assumptions pertaining to the adult learner in an effort to establish veterinary students as adult learners. Some key theoretical perspectives in adult education were also reviewed, including the seminal works of Malcolm Knowles with his theory of andragogy. Self-directed learning theories were described from the perspectives of Houle, Tough, and also Knowles. The significance of experience as it pertains to adult learning was also analyzed from the works of Kolb and Mezirow. Also included is a historical perspective of distance education as it relates to adult education and technology-enhanced e-learning, focusing primarily on blended learning. Blended learning has a variation of definitions, but the review of the literature for this chapter pertained to those studies involving components of face-to-face instruction and computer-based synchronous delivery modalities, primarily using videoconferencing. This review provided an overview of blended learning within the health professions specifically in the disciplines of pharmacy education, nursing and medical education. Lastly, the review covered several studies pertaining to video conferencing or web conferencing in veterinary schools however no recent works were identified.

Chapter 3: Methods

Purpose of the Study

The purpose of the study was to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester. This study also examined student satisfaction when comparing two cohorts of students taught by remote learning during the same semester (semesters two and four in the curriculum).

Significance of the Study

This research examined satisfaction of veterinary students taught in a remote learning environment. The results can be used to increase awareness of perceptions of veterinary students as adult learners, particularly since remote learning has not been widely used in veterinary college curricula. Additionally, the results of this study can also provide insight into possible changes that could be made in the future as veterinary medical education seeks to find ways to utilize available technology to increase flexibility in learning while still providing a high-quality education and factoring in the rising costs of the doctor of veterinary medicine (DVM) education.

Research Questions

This study addressed the following research questions:

1. What is the relationship, if any, between student satisfaction and course delivery method?
2. What is the relationship, if any, between student satisfaction and cohort (first-year veterinary students and second-year veterinary students) in remote learning?

Research Design

This study explored the potential impact that remote learning opportunities had on veterinary students' satisfaction. To determine these relationships, a quantitative study was performed using data that were collected during a standard end-of-semester evaluation. These data were compiled by the Office of Academic Affairs (OAA) at a mid-sized public university in the Southeast. This sample of students was chosen due to the fact that they completed the end-of-semester survey and they were in one of two cohorts whose class schedule was impacted by being required to operate remotely due to the COVID-19 pandemic. An IRB approval was granted to use established data sets already collected by the University as part of standard end-of-semester surveys completed by students (See Appendix A). The research questions in this study were explored using a quantitative research design and the data were analyzed to examine relationships between the variables.

Population and Sample

The study consisted of a convenience sample of 245 veterinary students from two cohorts, enrolled in either semester two or semester four of the curriculum, during the 2019-2020 academic year. The cohort of students enrolled in semester two of the curriculum were first-year veterinary students and for this study were referred to as Group 1 and included 126 students. The cohort of students enrolled in semester four of the curriculum were second-year veterinary students and for this study were referred to as Group 2 and included 116 students. During this academic year, eleven total courses were impacted. Of the 245 students who were given the opportunity to complete the survey, 716 responses were derived from 11 classes. There was no duplication within a class, but a student may have been enrolled in four to seven classes during the survey period.

Instrumentation

The online end-of-semester survey used in this study consisted of 19 questions and was divided into three parts (see Appendix C). In the spring 2020 semester, all courses were required to be remote due to the COVID-19 pandemic and so the standard end-of-semester survey was altered to include questions related directly to the student's opportunity and satisfaction with remote learning at the veterinary school level. The end-of-semester survey was administered by the Office of Academic Affairs and was a voluntary survey. Students enrolled had the option not to complete the survey and there was no consequence for not participating. The survey was created and administered using an online course evaluation software called CourseEval. The survey sections are described below. For this study, which focused on the potential relationship between student satisfaction and remote learning, only the data from the third section with statements pertaining to remote learning was analyzed and utilized in an effort to answer the research questions.

The first section of the survey, entitled course questions, was comprised of five questions pertaining to basic information about the course with a six-point Likert-type scale response for the first four questions. The last question in this section was open-ended for comments. Some of the statements in this section included: "Course objectives were clear," and "This course contributed significantly to my education."

The second section of the survey entitled instructor questions was comprised of six questions pertaining to basic information about the instructor with a six-point Likert-type scale response for the first five questions. The last question, again, was open-ended for comments. Some of the statements in this section included: "The instructor created a conducive atmosphere for learning," and "The instructor explained course material clearly."

Lastly, the remaining section was added as a supplemental section due to the remote nature required as a result of the pandemic. This section was entitled remote learning questions and contained eight questions pertaining directly to the opportunity for the remainder of the semester to be remote. The first five questions contained a six-point Likert-type scale response. For the six-point Likert-type scale, respondents were asked to indicate their agreement or disagreement with each of the statements. The answer choices for each scale ranged from *Strongly Agree* to *Strongly Disagree* (*Strongly Agree* (6), *Agree*, *Slightly agree*, *Slightly disagree*, *Disagree*, *Slightly Disagree* (1)). The last three of the eight questions were open-ended, and due to the quantitative nature of this study, this information was not utilized. Some of the statements in this section included: “I prefer streaming live lectures rather than watching recorded lectures,” and “The tools available to me for online learning (e.g. device, modem, internet speed, etc.) were adequate for the transition to remote instruction.”

Data Collection

Students had the opportunity to take the end-of-semester survey starting on the last day of classes and the survey remained open until approximately four days after the final exam for that same class. On average, they had about 10 days to complete the survey. The students were emailed the link and given one reminder before the survey closed as another prompt to complete the survey. As mentioned before, it was completely voluntary. The data collected pertained to all courses in semester two and semester four of the professional curriculum which were affected by the requirement to transition to remote learning for the remainder of the spring 2020 semester (eleven courses total).

After the surveys were closed, the data were collected by an individual in the Office of Academic Affairs at the veterinary school. In order to keep the data included confidential, all

identifying information from the courses was removed. In addition, no demographic data was captured from the students so that participants nor courses were identifiable.

Data Analysis

Measures of dispersion and frequency distributions were used in analyzing and reviewing the survey responses. A report was generated from the CourseEval program that specifically pertained to the courses of interest. This report gave the mean and standard deviation for each question in the survey in each course (eleven courses total, fourteen questions with a Likert scale). The researcher then extracted the data from CourseEval and downloaded it into The Statistical Package for Social Sciences (SPSS®) system for data analysis. Frequency testing was used to analyze the data from each question, based on the 6-point Likert scale. Descriptive statistics were run for each group of participants, based on the number within the semester having the opportunity to take the survey for each class. Group one had 126 participants total and were enrolled in semester two of the curriculum (first year veterinary students), and group two had 116 participants in total and were enrolled in semester four of the curriculum (second year veterinary students). The mean and standard deviation was calculated for the responses to each remote learning statement. Also, a frequency table was prepared showing the frequency of responses for each Likert score on each remote learning statement.

Summary

This chapter presented the purpose of the study, stated research questions, detailed the design of the study, described the population and sample, discussed the study's instrumentation, and reviewed data collection and analysis methods. The survey and data collection procedures were approved by the Institutional Review Board (IRB), and all data were stored securely in an online portal called CourseEval.

Chapter 4: Findings

The findings of this study and the data pertaining to each of the research questions are presented in Chapter 4. This study utilized measures of dispersion and frequency distributions to analyze participant responses.

Purpose of the Study

The purpose of the study was to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester. This study also examined student satisfaction when comparing two cohorts of students taught by remote learning during the same semester (semesters two and four in the curriculum).

Significance of the Study

This research examined satisfaction of veterinary students taught in a remote learning environment. The results can be used to increase awareness of perceptions of veterinary students as adult learners, particularly since remote learning has not been widely used in veterinary college curricula. Additionally, the results of this study can also provide insight into possible changes that could be made in the future as veterinary medical education seeks to find ways to utilize available technology to increase flexibility in learning while still providing a high-quality education and factoring in the rising costs of the doctor of veterinary medicine (DVM) education.

Research Questions

This study addressed the following research questions:

1. What is the relationship, if any, between student satisfaction and course delivery method?

2. What is the relationship, if any, between student satisfaction and cohort (first-year veterinary students and second-year veterinary students) in remote learning?

Description of the Sample

The study consisted of a convenience sample of 245 veterinary students from two cohorts, enrolled in either semester two or semester four of the curriculum, during the 2019-2020 academic year. The cohort of students enrolled in semester two of the curriculum were first-year veterinary students and for this study were referred to as Group 1 and included 126 students. The cohort of students enrolled in semester four of the curriculum were second-year veterinary students and for this study were referred to as Group 2 and included 116 students. During this academic year, eleven total courses were impacted in the first two years of the curriculum, being required to transition from the classroom to remote learning. Of the eleven courses, the students in Group 1 were enrolled in seven of the eleven courses. The students in Group 2 were enrolled in four of the eleven courses. The data was analyzed at the class level (Group 1 and Group 2) as permission was not granted to discuss the data at the individual course level. The overall mean completion rate to the end-of-semester evaluation from the seven courses for which Group 1 was enrolled was 65% ($M = 82$). The overall mean completion rate to the end-of-semester evaluation from the four courses in which Group 2 was enrolled was lower at 30% ($M = 35$).

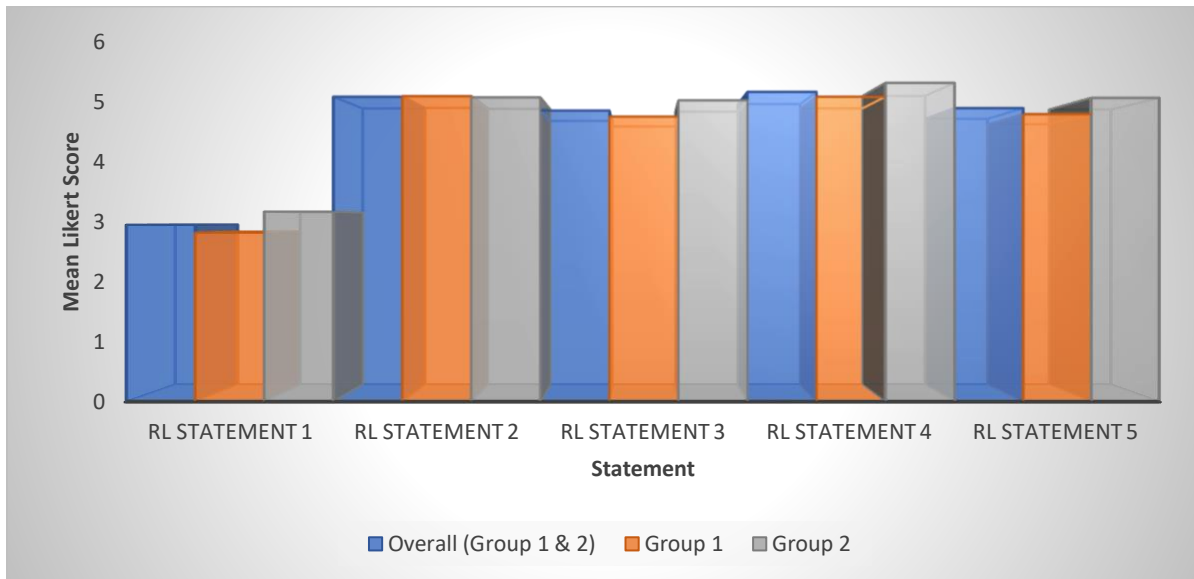
Description of the Survey Results

To answer the first research question, five statements pertaining to remote learning in the end-of-semester evaluation were considered. For each of the five statements, the answer choices were represented by a six-point Likert-type scale that ranged from *strongly agree* (6) to *strongly disagree* (1). The results from each of the five statements were characterized, including the mean (M) and the standard deviation (SD). The mean (M) for both groups together, Group 1 and

Group 2 are displayed below (Figure 1). In addition, a frequency table was prepared showing the dispersion of responses for each Likert-type score, on each statement reviewed (Figures 2-6).

Figure 1

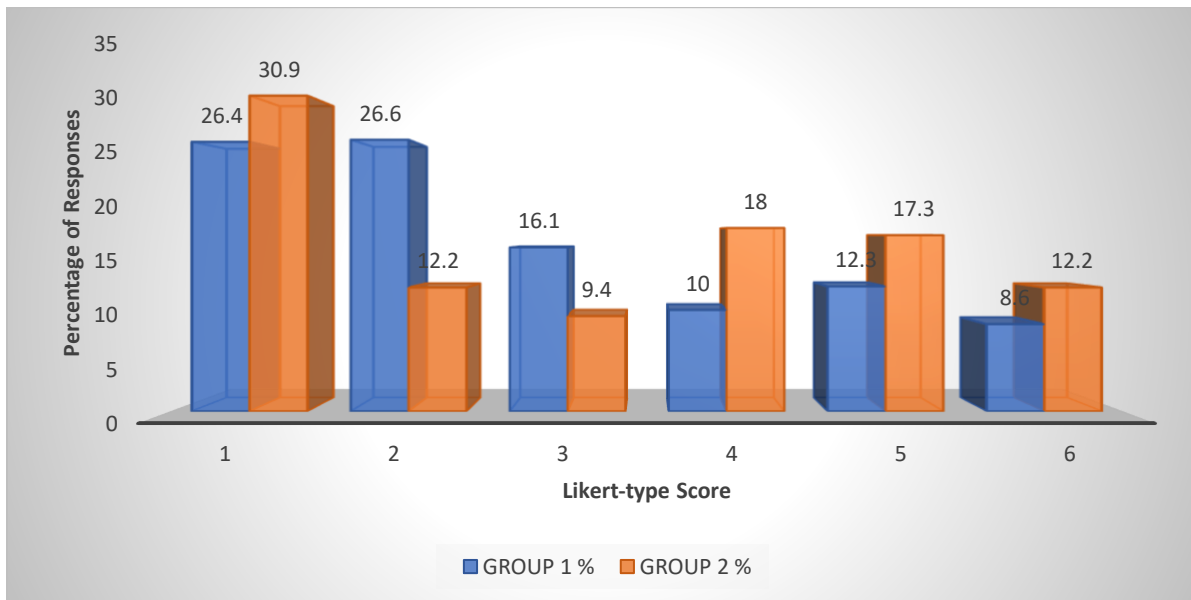
Mean Likert-type Score for Remote Learning (RL) Statements



The first remote learning statement used to assess student satisfaction related to delivery method was, “I prefer streaming live lectures rather than watching recorded lectures.” There were 610 total responses to statement one across all courses in both classes; 571 responses were from Group 1 and 139 responses from Group 2. Overall, for both groups, the mean response for this question was $M = 2.93$ ($SD = 1.69$). This corresponded to a mean response of being greater than a 2 (*disagree*) and just less than a 3 (*slightly disagree*). For Group 1, the mean score for this question was $M = 2.80$ ($SD = 1.62$), with 571 total responses from the seven classes total, which corresponded on the Likert-type scale to being just below *slightly disagree* (3) and above *disagree* (2). The mean score was slightly higher for Group 2 at 3.15 ($M = 3.15$, $SD = 1.81$) with 139 total responses from the four classes total. Group 2’s response indicated more than *slightly disagree* (3) but less than *slightly agree* (4) on the Likert-type scale.

Figure 2

Frequency by Group for Remote Learning (RL) Statement 1



The frequency of responses based on percentage of response for statement 1 are presented in Figure 2. The most common response to statement 2 was *strongly disagree* with 194 total responses overall from both groups. Student disagreement with this statement was more pronounced in Group 1 compared to Group 2 with 53% of responses falling in the *strongly disagree* or *disagree* categories in Group 1 responses compared to 42.9% of Group 2 respondents. The numbers and percentages of responses from Group 1 and Group 2 are listed in tables below (Table 1).

Table 1

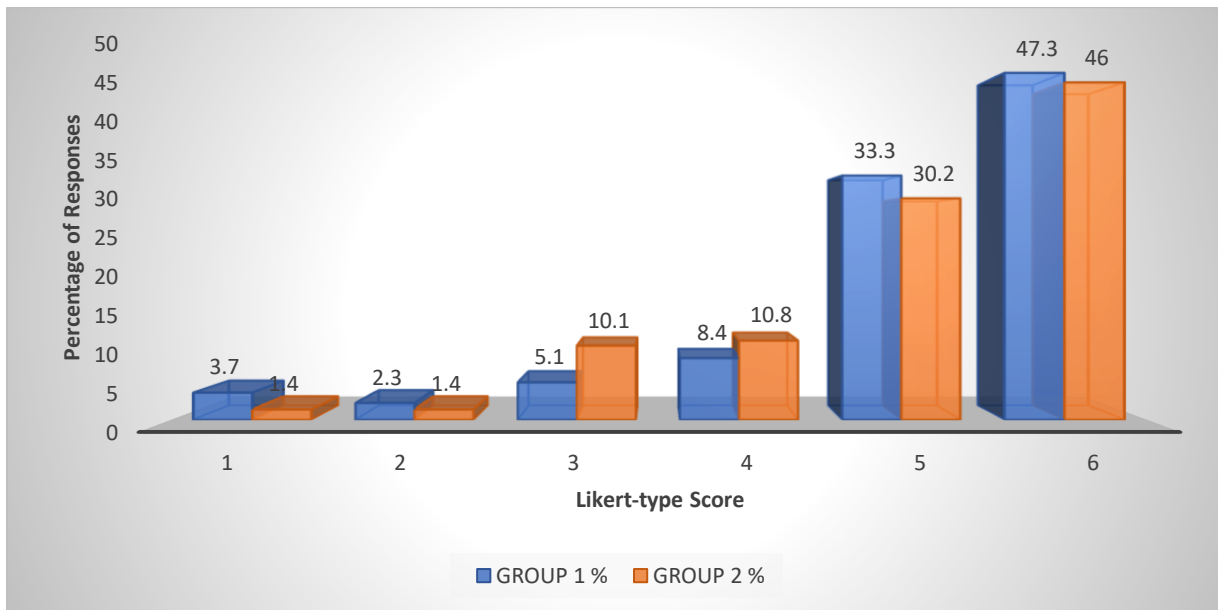
Number and Percentage of Respondents' Likert-type scores for RL Statement 1, Groups 1 and 2

| Likert Score | Group 1 n | Group 1 % Response | Group 2 n | Group 2 % Response |
|---------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| 1 | 151 | 26 | 43 | 31 |
| 2 | 152 | 27 | 17 | 12 |
| 3 | 92 | 16 | 13 | 9 |
| 4 | 57 | 10 | 25 | 18 |
| 5 | 70 | 12 | 24 | 17 |
| 6 | 49 | 9 | 17 | 12 |

The next statement analyzed to assess student satisfaction related to remote learning was, “I prefer a single 50-minute lecture rather than multiple shorter lectures segments.” A total of 610 responses were recorded for question 2 across all courses in both classes; from Group 1 there were 571 responses and from Group 2 there were 139 responses. For both groups, overall, the mean response for this statement was $M = 5.063$ ($SD = 1.19$). The mean overall indicated *agree* (5) on the Likert-type scale. For this statement, the mean for Group 1 was $M = 5.07$ ($SD = 1.24$) with 571 responses; this again corresponded on the Likert-type scale to 5 (*agree*). Group 2 had a total of 139 responses for this statement and a similar mean ($M = 5.05$, $SD = 1.120$), which also indicated *agree* on the Likert scale.

Figure 3

Frequency by Group for Remote Learning (RL) Statement 2



The frequency of responses based on percentage of response for remote learning (RL) statement 2 are presented in Figure 3. Overall, the most common response to statement 2 was *strongly agree* with 334 total responses. For this statement student agreement was demonstrated in both groups. For Group 1, 80.6% of respondents answered either *strongly agree* or *agree*, and for Group 2, 76.2% of respondents answered with those same two choices. The numbers and percentages of responses from Group 1 and Group 2 are listed in tables below (Table 2) for statement 2.

Table 2

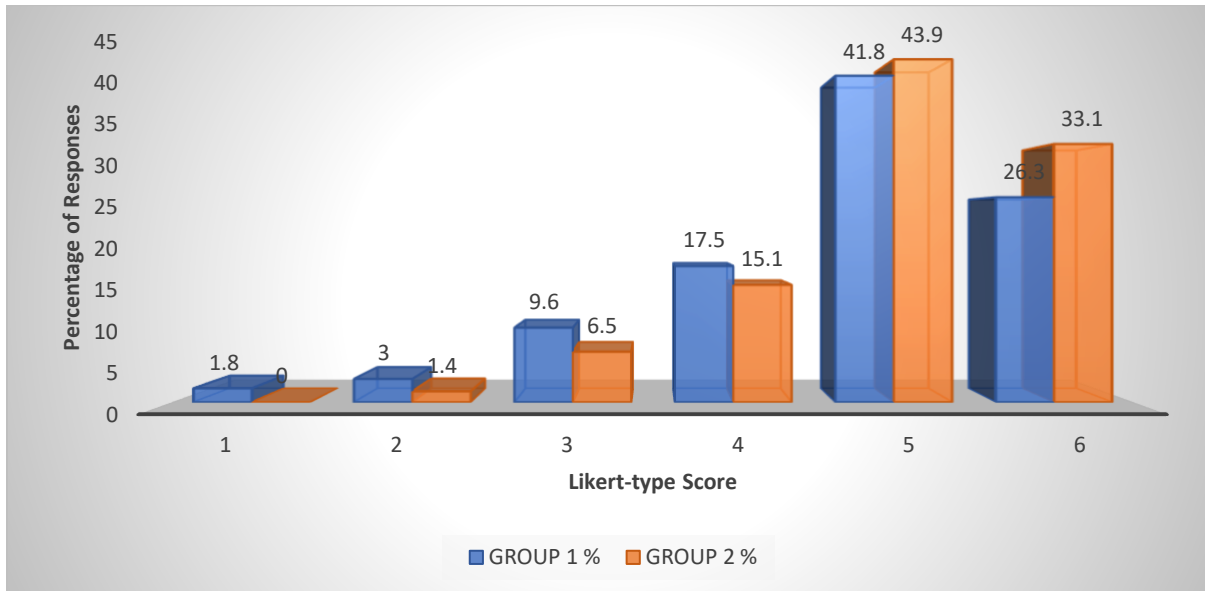
Number and Percentage of Respondents' Likert-type scores for RL Statement 2, Groups 1 and 2

| Likert Score | Group 1 n | Group 1 % Response | Group 2 n | Group 2 % Response |
|---------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| 1 | 21 | 4 | 2 | 1 |
| 2 | 13 | 2 | 2 | 1 |
| 3 | 29 | 5 | 14 | 10 |
| 4 | 48 | 8 | 15 | 11 |
| 5 | 190 | 33 | 42 | 30 |
| 6 | 270 | 47 | 64 | 46 |

Statement 3 from the survey also pertained to satisfaction with remote learning and asked, “The tools available to me for online learning (e.g., device, modem, internet speed, etc.) were adequate for the transition to remote instruction.” Responses to this statement totaled 609 from both classes and all courses, with 570 responses from Group 1 and 139 responses from Group 2. The overall mean for both groups was ($M = 4.83$, $SD = 1.06$) and this response corresponded to less than 5 (*agree*) and more than 4 (*slightly agree*) on the associated Likert-type scale. The mean for Group 1 corresponded to in between *slightly agree* and *agree* ($M = 4.73$, $SD = 1.14$), with 570 responses analyzed. Group 2 was slightly higher ($M = 5.00$, $SD = 0.92$) with 139 recorded responses. On the Likert-type scale, the mean response for Group 2 indicated *agree* (5).

Figure 4

Frequency by Group for Remote Learning (RL) Statement 3



The frequency of responses based on percentage of response for statement 3 are presented in Figure 4. A majority of the participants chose *agree* with this statement, with 299 total responses. Additionally, there were 196 responses from participants who chose *strongly agree* with this statement. Student agreement with this statement was more pronounced in Group 2 compared to Group 1 with 76.9% of responses falling into the *agree* or *strongly agree* category for Group 2. Group 1 had 68.1% of responses falling into those two same categories for Statement 3. The numbers and percentages of responses from Group 1 and Group 2 are listed in tables below (Table 3) for statement 3.

Table 3

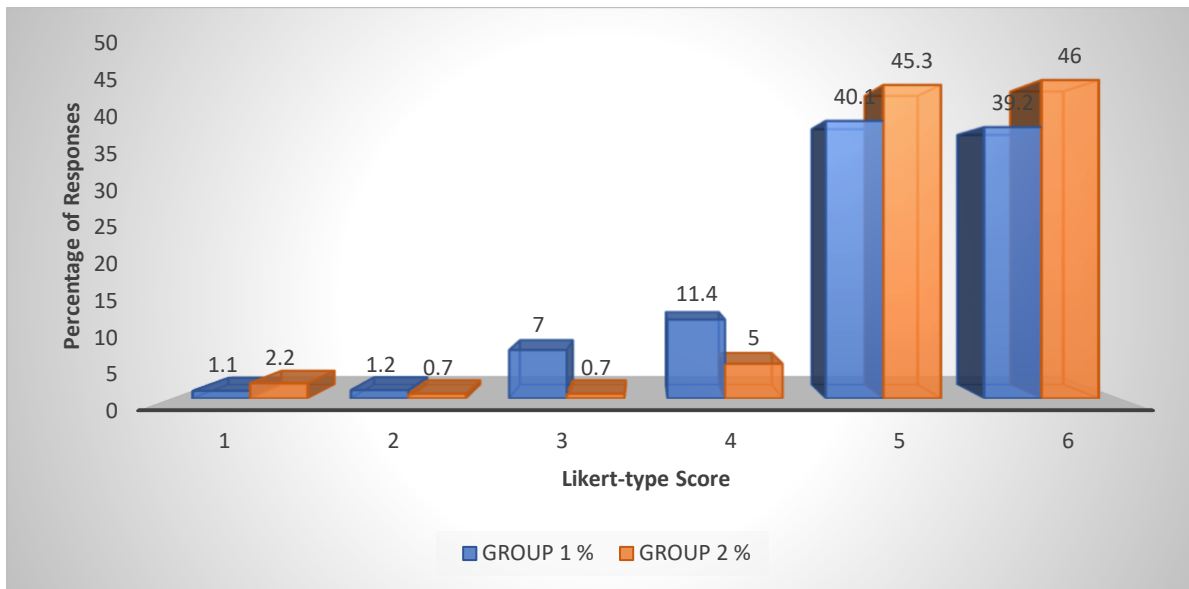
Number and Percentage of Respondents' Likert-type scores for RL Statement 3, Groups 1 and 2

| Likert Score | Group 1 n | Group 1 % Response | Group 2 n | Group 2 % Response |
|---------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| 1 | 10 | 1.8 | 0 | 0 |
| 2 | 17 | 3 | 2 | 1.4 |
| 3 | 55 | 9.6 | 9 | 6.5 |
| 4 | 100 | 17.5 | 21 | 15.1 |
| 5 | 238 | 41.8 | 61 | 43.9 |
| 6 | 150 | 26.3 | 46 | 33.1 |

The next statement that was used to analyze the satisfaction of student with remote learning was the following, “The remote/online course materials supported my learning.” Between Group 1 and 2 the overall responses recorded for this question were 610. Group 1 and Group 2 had 571 and 139 responses recorded, respectively. The overall mean for both groups was 5.14 ($M = 5.14$, $SD = 0.99$); this response corresponded to just above a 5 (*agree*) but less than a 6 (*strongly agree*) on the Likert-type scale. Group 1 had a mean of 5.06 ($M = 5.06$, $SD = 1.02$); this corresponded to *agree* with this statement. The mean score for Group 2 was higher ($M = 5.29$, $SD = 0.93$) and corresponded to being greater than a 5 (*agree*) and less than a 6 (*strongly agree*).

Figure 5

Frequency by Group for Remote Learning (RL) Statement 4



The frequency of responses based on percentage of response for statement 4 are presented in Figure 5. For this statement, the two most common responses were very similar in both numbers and percentages, for both groups together. A total of 292 respondents chose *agree* while a total of 288 respondents chose *strongly agree* with the overall majority in some form of agreement with this statement. For Group 1, 40.1% (229) of respondents chose *agree* and 39.2% (224) respondents chose *strongly agree* resulting in 79.3% of Group 1 selecting one of those two responses. In comparison, for Group 2, 45.3% (63) respondents selected *agree* in response to this statement, while 46% (64) respondents selected *strongly agree* in response to this statement. The numbers and percentages of responses from Group 1 and Group 2 are listed in tables below (Table 4) for statement 4.

Table 4

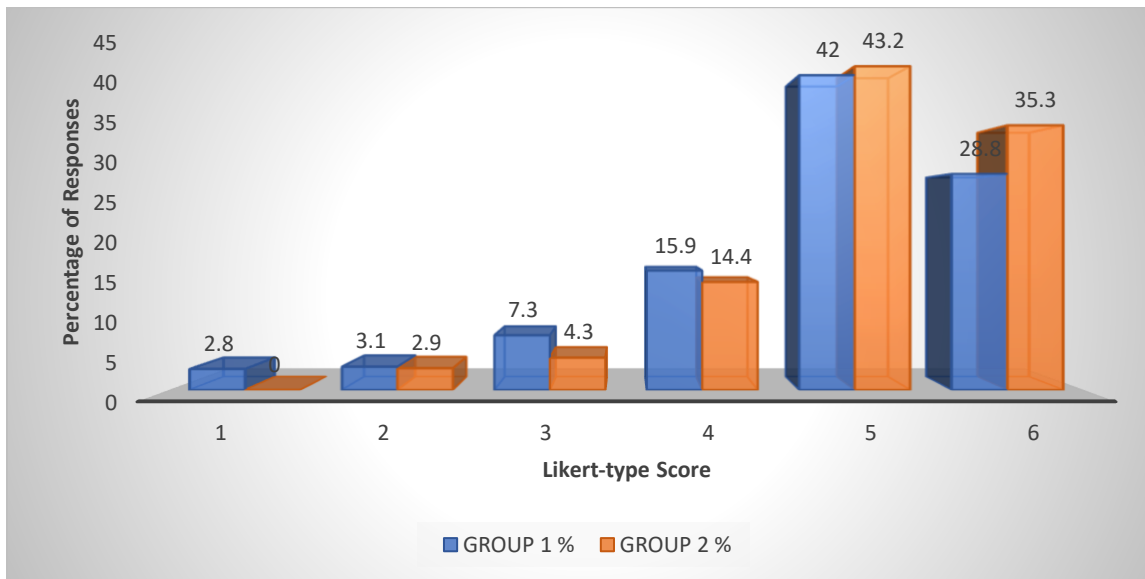
Number and Percentage of Respondents' Likert-type scores for RL Statement 4, Groups 1 and 2

| Likert Score | Group 1 n | Group 1 % Response | Group 2 n | Group 2 % Response |
|---------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| 1 | 6 | 1.1 | 3 | 2.2 |
| 2 | 7 | 1.2 | 1 | 0.7 |
| 3 | 40 | 7 | 1 | 0.7 |
| 4 | 65 | 11.4 | 7 | 5 |
| 5 | 229 | 40.1 | 63 | 45.3 |
| 6 | 224 | 39.2 | 64 | 46 |

“The support I received for online learning (IIT, course coordinator/instructors, CVM administration, etc.) was adequate for the transition to remote instruction),” was the last statement used to explore the students’ satisfaction with remote learning. There were 611 responses overall from both groups in the eleven courses. Group 1 had a total of 572 responses and Group 2 had 139 responses. Overall, the mean response for both groups was 4.87 ($M = 4.87$, $SD = 1.08$). This indicated that the mean response was less than a 5 (*agree*) and greater than a 4 (*slightly agree*) related to the statement. For Group 1, the mean was less than the overall mean for both groups ($M = 4.77$, $SD = 1.15$) with 572 responses recorded. The mean for Group 2 was slightly higher than the overall mean ($M = 5.04$, $SD = 0.96$), determined from 139 responses. This mean corresponded with *agree* (5) on the Likert-type scale.

Figure 6

Frequency by Group for Remote Learning (RL) Statement 5



The frequency of responses based on percentage of response for statement 5 are presented in Figure 6. The most common response to Statement 5 was *agree* with 300 total responses. Student agreement with this statement for Group 1 reflected that 70.8% of responses were in the categories of *strongly agree* or *agree*. Group 2, in contrast, had more agreement with this statement as 78.5% of responses from students fell into the *strongly agree* or *agree* categories. The numbers and percentages of responses from Group 1 and Group 2 are listed in tables below (Table 5) for statement 5.

Table 5

Number and Percentage of Respondents' Likert-type scores for RL Statement 5, Groups 1 and 2

| Likert Score | Group 1 n | Group 1 % Response | Group 2 n | Group 2 % Response |
|---------------------|----------------------|-------------------------------|----------------------|-------------------------------|
| 1 | 16 | 2.1 | 0 | 0 |
| 2 | 18 | 3.1 | 4 | 2.9 |
| 3 | 42 | 7.3 | 6 | 4.3 |
| 4 | 91 | 15.9 | 20 | 14.4 |
| 5 | 240 | 42 | 60 | 43.2 |
| 6 | 165 | 28.8 | 49 | 35.3 |

Summary of the Findings

Chapter 4 presented the findings and utilized measures of dispersion and frequency distributions to analyze participant responses. A total of 245 participants contributed to this data, from two cohorts of veterinary students enrolled in two different semesters in the curriculum (first year and second year veterinary students). Group 1 had a total of 126 students enrolled in seven courses and the mean completion rate to the end-of-semester evaluation for those courses was 65% ($M = 82$). For Group 2 which had 116 students enrolled in four courses, the mean completion rate to the end-of-semester evaluation was lower at 30% ($M = 35$).

Research Question 1 was “What is the relationship, if any, between student satisfaction and course delivery method?” The first remote learning statement was, “I prefer streaming live lectures rather than watching recorded lectures.” For this there were 610 total responses over all courses in both classes. For both groups, the overall Likert-type score was $M = 2.93$ ($SD = 1.69$) which means that the combined mean of the group slightly disagreed to preferring streaming live lectures over watching recorded lectures. Furthermore, the most common response to the first statement was *strongly disagree* with 194 total responses from both groups, indicating that they did not prefer streaming live lectures over watching recorded lectures. The second remote

learning statement was, “I prefer a single 50-minute lecture rather than multiple shorter lecture segments.” For this statement, there were 610 recorded responses and the overall Likert-type score for this statement was $M = 5.07$ ($SD = 1.19$) which indicated that students overall agreed with this statement that they preferred a single 50-minute lecture rather than multiple short lecture segments. Additionally, overall, the most common response to statement 2 was *strongly agree* with 334 total responses.

The third remote learning statement also contributed to answering Research Question 1. The third statement was, “The tools available to me for online learning (e.g., device, modem, internet speed, etc.) were adequate for the transition to remote instruction.” Out of 609 responses to this statement, the mean Likert-type score was 4.83 ($SD = 1.06$), which indicated that students did agree with this statement overall. Regarding the frequency distribution, a majority of participants chose *agree* with 299 total responses for the Likert-type score 5. “The remote/online course materials supported my learning,” was the fourth remote learning statement. With 610 participants responding, the overall Likert-type score mean was 5.14 ($SD = 0.99$) indicating that students agreed with the statement. Additionally, based on frequency distribution of Likert-type score a majority of students chose *agree* (292) or *strongly agree* (288) in response to being supported through course materials for online learning. The final remote learning statement was “The support I received for online learning (IIT, course coordinator/instructors, CVM administration, etc.) was adequate for the transition to remote instruction” and the mean Likert-type score for this statement was *slight agreement* ($M = 4.87$, $SD = 1.08$) from 611 student responses. The most common response to this statement was *agree* with 300 total student responses.

Research Question 2 was, “What is the relationship, if any, between student satisfaction and cohort (first year veterinary students and second year veterinary students) in remote learning?” For remote learning statement 1, Group 1 had more pronounced disagreement with this statement as 69.1% of responses fell into *strongly disagree*, *disagree* or *slightly disagree* indicating a majority of this group did not prefer streaming live lectures over watching recorded lectures. For remote learning statement 1, Group 2 was more divided in their response as only just over half of respondents (52.5%) chose *strongly disagree*, *disagree* or *slightly disagree* regarding a preference of streaming live lectures over recorded lectures. On the other hand, 47.6% of respondents selected *strongly agree*, *agree* or *slightly agree* which indicated they did have a preference of streaming live lectures over watching recorded lectures. For remote learning statement 2, student agreement was demonstrated by both groups regarding the preference of one 50-minute lecture compared to multiple shorter segments of lecture. For Group 1, 80.6% of respondents answered either *strongly agree* or *agree* and for Group 2, 76.2% of respondents answered the same two choices. In terms of the differences in Group 1 and 2 for remote learning statement 3, student agreement was more pronounced in Group 2 compared to Group 1. For Group 1, 68.1% of responses fell into the categories of *agree* or *strongly agree*. For Group 2, 76.9% of responses fell into the same two categories. For remote learning statement 4, both Groups indicated a majority of students were in agreement with this statement. Group 1 had 79.3% of respondents answering either *agree* or *strongly agree* to remote learning statement 4. With Group 2, the majority was even more significant with 91.3% of respondents answering *agree* or *strongly agree*. The last remote learning statement again indicated student agreement with this statement by a majority of students for both groups. The responses of *agree*

or *strongly agree* were selected for 70.8% of students for Group 1 and 78.5% of students answered the same two categories from Group 2.

This chapter presented descriptive statistics and frequency distribution tables to consider the study's data. Chapter 5 addresses and discusses the implications of these findings in greater details, as well as how this information can and should be considered by others who wish to carry out the same/similar study. Chapter 5 also provides recommendations for future research and an overall summary of the study at hand.

Chapter 5: Summary, Implications, Limitations and Recommendations

This study sought to examine the satisfaction of veterinary students taught through remote learning. Chapter 1 introduced the research study's purpose, statement of the problem, research questions, limitations and definition of terms. Chapter 2 presented a literature review of the theoretical perspectives of adult learning including characteristics of adult learners. Chapter 2 also reviewed distance education, and then focused on the term blended learning as used in the literature in the health professions including nursing, pharmacy, medicine and veterinary medicine education. Chapter 3 discussed this study's research design, sample, data collection, and analytical methods. Chapter 4 provided the findings of the study. Chapter 5 offers a summary of the study's findings and concludes with a discussion on implications, limitations of the study, and future recommendations.

Purpose of the Study

The purpose of the study was to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester. This study also examined student satisfaction when comparing two cohorts of students taught by remote learning during the same semester (semesters two and four in the curriculum).

Significance of the Study

This research examined satisfaction of veterinary students taught in a remote learning environment. The results can be used to increase awareness of perceptions of veterinary students as adult learners, particularly since remote learning has not been widely used in veterinary college curricula. Additionally, the results of this study can also provide insight into possible changes that could be made in the future as veterinary medical education seeks to find ways to utilize available technology to increase flexibility in learning while still providing a high-quality

education and factoring in the rising costs of the doctor of veterinary medicine (DVM) education.

Research Questions

This study addressed the following research questions:

1. What is the relationship, if any, between student satisfaction and course delivery method?
2. What is the relationship, if any, between student satisfaction and cohort (first-year veterinary students and second-year veterinary students) in remote learning?

Summary

An examination of the perceived satisfaction of veterinary students with remote learning and the differences noted between two cohorts was the central goal of this study. For this study, a convenience sample of 245 veterinary students from two cohorts (enrolled in semester two or semester four of the curriculum) were given the opportunity to complete the end-of-semester survey. Of those, 716 responses were derived from 11 classes. The survey consisted of three sections and the statements from the third section, entitled Remote Learning Questions were used to answer the research questions. This study utilized measures of dispersion and frequency distributions to analyze participant responses.

Implications

The purpose of this study was to examine whether there was a relationship between veterinary student satisfaction and delivery method utilized in remote learning. In considering the overall student response to the first remote learning statement, “I prefer streaming live lectures rather than watching recorded lectures,” for both groups there was a mixed result, meaning a majority of the students did not agree to this statement nor disagree with this

statement. This information is relevant and in line with the knowledge of veterinary students being categorized as adult learners. As previously mentioned in Chapter 2, adult learners are described as self-directed by Houle (1961), Tough (1971), and Knowles (1975) resulting in their ability to take initiative in the learning process. The implication is that veterinary students have a variety of learning needs, and the varied delivery methods that resulted in this semester worked differently for the individual student based on their understanding of how they learn.

Furthermore, an additional implication from this study also touches on what Ruiz (2006) conveyed regarding blended learning in medical education. One way of achieving a blended-learning strategy is through utilizing videoconferencing (synchronous or asynchronous) with traditional classroom instruction. Providing a remote learning option (streaming live lectures, recorded lectures or both) combined with a traditional classroom delivery method further supports the needs of veterinary students as adult learners by providing them the opportunity and flexibility for selecting their preferred learning method with the additional opportunity to review the material again for study purposes. This has the potential to shift the learning environment for veterinary medicine towards the application of more adult learning theory, as Ruiz (2006) previously discussed in medical education. Furthermore, blended learning provides an educational environment that benefits from the best of both delivery modalities working through synergism, and the remote learning component serves as complementary to the traditional classroom setting. With the combination of technology, the digitally-savvy students of the present generation, and advanced learning management systems, remote learning components are more easily integrated from the educator perspective and more easily accessible from the student perspective. The spring semester of 2020 therefore served to more widely open the door to

veterinary medical education transforming in ways that may have never been considered, if they had not been required due to the challenges of continuing education in the midst of a pandemic.

Limitations

There are several limitations to this study. The initial limitation is the use of data from one semester, at the beginning of a global pandemic. As a result of the COVID-19 pandemic, all classes were required to go remote in the middle of the semester. Therefore, remote learning was not the plan from the beginning of the semester and was a contingent plan to maintain the classes throughout the remainder of the semester.

Another limitation is that the data were gathered from a convenience sample at a single veterinary school from a large southeastern university. Therefore, the results may not be characteristic of students at other colleges, and extreme care should be exercised when generalizing the results to a larger student population.

Additionally, for this study, only one semester within the academic year was evaluated. More reliable data may have been obtained from a study on several cohorts year to year of veterinary students or by following the same cohort throughout the first three years of the veterinary curriculum (those semesters that are primarily in the classroom).

And lastly, a limitation of the study was the numbers of responses per cohort. There was a significant difference between the responses to the survey as Group 1 (first-year veterinary students) was compared to Group 2 (second-year veterinary students). It would be beneficial to have similar numbers of respondents from both cohorts to compare. Additionally, increasing the number of courses overall that were reviewed would also be beneficial thus providing an opportunity to perform inferential statistical analyses of the data.

Recommendations for Future Study

Since the topic of this study was on the subject of remote learning in veterinary medicine, there are several opportunities for future research. The following recommendations are not prioritized in any particular order but would be beneficial to understanding the perceptions of veterinary students as adult learners, in relation to remote learning opportunities.

1. Considering the nuances of delivery method, there are many ways to further investigate this topic. Within the literature, the terms are not clearly defined but with utilizing videoconferencing software, questions can specifically investigate students' perceptions and satisfaction regarding live vs. recorded lectures, synchronous vs. asynchronous and traditional classroom vs. remote learning.
2. For this end-of-semester survey that was utilized, there are two sections pertaining to the course itself and the instructor. It would be recommended to analyze the previous years' data in an effort to compare satisfaction with the same courses compared to 2020 (where remote learning was forcefully instituted).
3. Another beneficial study worth conducting would be to study subsequent semesters in 2020 and 2021, as the pandemic was ongoing and remote learning was still required yet became more "normalized", compared to the traditional classroom setting. In the veterinary school at the institution where this research project was conducted, hy-flex was a teaching modality that was instituted. The end-of-semester survey could still be utilized as the same remote learning questions remained on the survey.
4. This study focused on the opinions of veterinary students in two cohorts who were attending a university in the Southeastern part of the United States. It is recommended that future research increase the sample size and utilize a sample that is more

representative of the national population to make the findings more generalizable.

Individuals could accomplish these goals by collecting data from multiple institutions in different regions or across the nation.

5. Lastly, future research would also benefit by designing a survey instrument specifically for the purpose of assessing student satisfaction as it pertains to remote learning and a quantitative analysis would provide additional details and more in-depth information regarding the topic of veterinary students and their perceptions of remote learning.

References

- Acor, G. K. (2005). "Blended" online technology: maximizing instructor reach. *Journal of Veterinary Medical Education*, 32(1), 51–56. <https://doi.org/10.3138/jvme.32.1.51>
- Baran, S. W., Johnson, E. J., & Kehler, J. (2009). An introduction to electronic learning and its use to address challenges in surgical training. *Lab Animal*, 38(6), 202–210. <https://doi.org/10.1038/lab0609-202>
- Boeve, J. (2012). An overview of Malcolm Knowles' concept of andragogy. *DE Oracle*, 125–129.
- Chen, C., & Jones, K. (2007). Blended learning versus traditional classroom settings: assessing effectiveness and student perceptions in an MBA accounting course. *The Journal of Educators Online*, 4(1). <https://doi.org/10.9743/JEO.2007.1.3>
- Chisholm, M. A., Miller, A. W., Spruill, W. J., Cobb, H. H., Reinhardt, B. O., Terry, A. V., Reese, R. L., & Wade, W. E. (2000). Influence of interactive videoconferencing on the performance of pharmacy students and instructors. *American Journal of Pharmaceutical Education*, 64(Summer), 152–158.
- Cook, D. A. (2014). The value of online learning and MRI: finding a niche for expensive technologies. *Medical Teacher*, 36(11), 965–972. <https://doi.org/10.3109/0142159X.2014.917284>
- Cross, P. (1981). *Adults as learners: Increasing participation and facilitating learning*. Jossey-Bass.
- Dale, V. H. M., Sullivan, M., & May, S. A. (2008). Adult learning in veterinary education: theory to practice. *Journal of Veterinary Medical Education*, 35(4), 581–588. <https://doi.org/10.3138/jvme.35.4.581>

- Dhein, C. R. (2007a). Current perspectives on distance education in veterinary medicine. *Journal of Veterinary Medical Education*, 34(3), 286–291. <https://doi.org/10.3138/jvme.34.3.286>
- Dhein, C. R. (2007b). The use of web-conferencing in the college of veterinary medicine at Washington State University. *Journal of Veterinary Medical Education*, 34(3), 292–298. <https://doi.org/10.3138/jvme.34.3.292>
- Foronda, C., & Lippincott, C. (2014). Graduate nursing students' experience with synchronous, interactive videoconferencing within online courses. *The Quarterly Review of Distance Education*, 15(2), 1–8.
- Fox, B., McDonough, S., McConatha, B., & Marlowe, K. (2011). Establishing and maintaining a satellite campus connected by synchronous video conferencing. *American Journal of Pharmaceutical Education*, 75(5), 1–10.
- Ginns, P., & Ellis, R. (2007). Quality in blended learning: exploring the relationships between on-line and face-to-face teaching and learning. *The Internet and Higher Education*, 10(1), 53–64. <https://doi.org/10.1016/j.iheduc.2006.10.003>
- Gordon, H. (1993). Houle's typology: time for reconsideration. *The College Student Affairs Journal*, 12(2), 67–76.
- Green, R. A., Whitburn, L. Y., Zacharias, A., Byrne, G., & Hughes, D. L. (2018). The relationship between student engagement with online content and achievement in a blended learning anatomy course: student engagement in blended anatomy courses. *Anatomical Sciences Education*, 11(5), 471–477. <https://doi.org/10.1002/ase.1761>
- Harting, K., & Erthal, M. J. (2005). History of distance learning. *Information Technology, Learning, and Performance Journal*, 23(1), 35–44.

- Hiemstra, R. (1994). Self-directed learning. In *The International Encyclopedia of Education* (2nd ed.). Oxford Pergamon Press.
- Houle, C. O. (1961). The doctorate in adult education. *Adult Education*, *11*(3), 131–134.
<https://doi.org/10.1177/074171366101100302>
- Khalil, M. K., Abdel Meguid, E. M., & Elkhider, I. A. (2018). Teaching of anatomical sciences: a blended learning approach. *Clinical Anatomy*, *31*(3), 323–329.
<https://doi.org/10.1002/ca.23052>
- Kim, S. (2006). The future of e-learning in medical education: current trend and future opportunity. *Journal of Educational Evaluation for Health Professions*, *3*, 3.
<https://doi.org/10.3352/jeehp.2006.3.3>
- Klibanov, O. M., Dolder, C., Anderson, K., Kehr, H. A., & Woods, J. A. (2018). Impact of distance education via interactive videoconferencing on students' course performance and satisfaction. *Advances in Physiology Education*, *42*(1), 21–25.
<https://doi.org/10.1152/advan.00113.2016>
- Knowles, M. S. (1975a). *Self-directed learning: a guide for learners and teachers*. Association Press. <http://journals.sagepub.com/doi/10.1177/105960117700200220>
- Knowles, M. S. (1975b). Adult education: new dimensions. *Educational Leadership*, *33*(2), 85–88.
- Knowles, M. S. (1978). Andragogy: adult learning theory in perspective. *Community College Review*, *5*(3), 9–20. <https://doi.org/10.1177/009155217800500302>
- Knowles, M. S., Holton, E. F., & Swanson, R. A. (2005). *The adult learner: The definitive classic in adult education and human resource development* (6th ed). Elsevier.

- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice-Hall.
- Liu, Q., Peng, W., Zhang, F., Hu, R., Li, Y., & Yan, W. (2016). The effectiveness of blended learning in health professions: systematic review and meta-analysis. *Journal of Medical Internet Research*, *18*(1), e2. <https://doi.org/10.2196/jmir.4807>
- MacLaughlin, E., Supernaw, R., & Howard, K. (2004). Impact of distance learning using videoconferencing technology on student performance. *American Journal of Pharmaceutical Education*, *68*(3), 1–6.
- Maloney, S., Nicklen, P., Rivers, G., Foo, J., Ooi, Y. Y., Reeves, S., Walsh, K., & Ilic, D. (2015). A cost-effectiveness analysis of blended versus face-to-face delivery of evidence-based medicine to medical students. *Journal of Medical Internet Research*, *17*(7), e182. <https://doi.org/10.2196/jmir.4346>
- McKenna, K., Gupta, K., Kaiser, L., Lopes, T., & Zarestky, J. (2020). Blended learning: balancing the best of both worlds for adult learners. *Adult Learning*, *31*(4), 139–149. <https://doi.org/10.1177/1045159519891997>
- Merriam, S. B. (2001). Andragogy and self-directed learning: pillars of adult learning theory. *New Directions for Adult and Continuing Education*, *2001*(89), 3. <https://doi.org/10.1002/ace.3>
- Merriam, S. B., & Bierema, L. L. (2014). *Adult learning: Linking theory and practice* (1st edition). Jossey-Bass, a Wiley brand.
- Merriam, S. B., & Caffarella, R. S. (1999). *Learning in adulthood: A comprehensive guide* (2nd ed). Jossey-Bass Publishers.

- Mezirow, J. (1997). Transformative learning: theory to practice. *New Directions for Adult and Continuing Education*, 1997(74), 5–12. <https://doi.org/10.1002/ace.7401>
- Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress* (1st ed). Jossey-Bass.
- O’Doherty, D., Dromey, M., Lougheed, J., Hannigan, A., Last, J., & McGrath, D. (2018). Barriers and solutions to online learning in medical education – an integrative review. *BMC Medical Education*, 18(1), 130. <https://doi.org/10.1186/s12909-018-1240-0>
- Oliver, M., & Trigwell, K. (2005). Can ‘blended learning’ be redeemed? *E-Learning and Digital Media*, 2(1), 17–26. <https://doi.org/10.2304/elea.2005.2.1.17>
- Pettit, R. K., Kinney, M., & McCoy, L. (2017). A descriptive, cross-sectional study of medical student preferences for vodcast design, format and pedagogical approach. *BMC Medical Education*, 17(1), 89. <https://doi.org/10.1186/s12909-017-0926-z>
- Ried, L. D., & McKenzie, M. (2004). A preliminary report on the academic performance of pharmacy students in a distance education program. *American Journal of Pharmaceutical Education*, 68(3), 1–8.
- Robinia, K. J., Maas, N. A., Johnson, M. M., & Nye, R. M. (2012). Program outcomes following implementation of a hybrid curriculum at the certificate level. *Nursing Education Perspectives*, 33(6), 374–377.
- Ross-Gordon, J., Rose, A., & Kasworm, C. (2017). *Foundations of Adult and Continuing Education* (1st ed.). Jossey-Bass.
- Ruiz, J. G., Mintzer, M. J., & Leipzig, R. M. (2006). The impact of e-learning in medical education. *Academic Medicine: Journal of the Association of American Medical Colleges*, 81(3), 207–212. <https://doi.org/10.1097/00001888-200603000-00002>

- Scarborough, J. E. (2015). Synchronous videoconferencing in distance education for pre-licensure nursing. *Journal of Education and Training Studies*, 3(4), 68–72.
<https://doi.org/10.11114/jets.v3i4.797>
- Sims, M. H., Howell, N., & Harbison, B. (2007). Videoconferencing in a veterinary curriculum. *Journal of Veterinary Medical Education*, 34(3), 299–310.
<https://doi.org/10.3138/jvme.34.3.299>
- Steinberg, M., & Morin, A. K. (2011). Academic performance in a pharmacotherapeutics course sequence taught synchronously on two campuses using distance education technology. *American Journal of Pharmaceutical Education*, 75(8), 150.
<https://doi.org/10.5688/ajpe758150>
- Sumner, J. (2000). Serving the System: A critical history of distance education. *Open Learning: The Journal of Open, Distance and e-Learning*, 15(3), 267–285.
<https://doi.org/10.1080/713688409>
- Tough, A. M. (1971). *The adult's learning projects: A fresh approach to theory and practice in adult learning* (1st ed). Learning Concepts.
- Trelease, R. B. (2016). From chalkboard, slides, and paper to e-learning: how computing technologies have transformed anatomical sciences education. *Anatomical Sciences Education*, 9(6), 583–602. <https://doi.org/10.1002/ase.1620>
- Vaughan, N. (2014). Student engagement and blended learning: making the assessment connection. *Education Sciences*, 4(4), 247–264. <https://doi.org/10.3390/educsci4040247>
- Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, 14(5), 216–223.
<https://doi.org/10.1108/09513540010344731>

- Wade, W. E., Cobb, H. H., Spruill, W. J., & Chisholm, M. A. (1999). Assessment of student performance in an advanced pharmacokinetics course taught by three methods of instructional delivery. *American Journal of Pharmaceutical Education*, 63(Spring), 82–85.
- Wells, M. I., & Dellinger, A. B. (2011). The effect of type of learning environment on perceived learning among graduate nursing students. *Nursing Education Perspectives*, 32(6), 406–410. <https://doi.org/10.5480/1536-5026-32.6.406>

Appendix A: IRB approval and application

From: IRB Administration <irbadmin@auburn.edu>
Sent: Thursday, August 13, 2020 9:05 AM
To: Sara-Louise Newcomer <sln0005@auburn.edu>
Cc: James Witte <witteje@auburn.edu>; James Satterfield <jws0089@auburn.edu>
Subject: Newcomer Approval Exempt Protocol #20-368 EX 2008, "Evaluating Student Satisfaction with Remote Learning in a Veterinary School"

Use IRBsubmit@auburn.edu for protocol-related submissions and IRBadmin@auburn.edu for questions and information. The IRB only accepts forms posted at <https://cws.auburn.edu/vpr/compliance/humansubjects/?Forms> and submitted electronically.

Dear Sara-Louise,

Your protocol entitled "Evaluating Student Satisfaction with Remote Learning in a Veterinary School" has been approved as "EX" under federal regulation 45 CFR 46.101(b)(4). Attached is your approved protocol.

Official notice:

This e-mail serves as official notice that your protocol has been approved. By accepting this approval, you also accept your responsibilities associated with this approval. Details of your responsibilities are attached.

Consent documents:

Since you do not have to wait to for the return of any consent documents, please conduct your study at your convenience.

Expiration:

Continuing review of this Exempt protocol is not required; however, all modification/revisions to the approved protocol must be reviewed and approved by the IRB.

When you have completed all research activities, have no plans to collect additional data and have destroyed all identifiable information as approved by the IRB, please notify this office via e-mail. A final report is no longer required for Exempt protocols.

Best wishes for success with your research!

IRB Admin
Office of Research Compliance
Auburn University
115 Ramsay Hall
Auburn, AL 36849

Auburn University Human Research Protection Program

EXEMPTION REVIEW APPLICATION

For information or help completing this form, contact: THE OFFICE OF RESEARCH COMPLIANCE,
Location: 115 Ramsay Hall Phone: 334-844-5966 Email: IRBAdmin@auburn.edu

Submit completed application and supporting material as one attachment to IRBsubmit@auburn.edu.

1. PROJECT IDENTIFICATION

Today's Date 7/23/2020

a. Project Title Evaluating Student Satisfaction with Remote Learning in a Veterinary School

b. Principal Investigator Sara-Louise Newcomer Degree(s) DVM
Rank/Title Graduate Clinical Lecturer Department/School Department of Clinical Sciences/Academic Affairs, College of Vet Med
Phone Number 352-206-4170 AU Email sln0005@auburn.edu

Faculty Principal Investigator (required if PI is a student) James. E. Witte
Title Professor Department/School AVN Dept./CLA
Phone Number 844-1905 AU Email witeje@auburn.edu

Dept Head James Satterfield Department/School Educational Foundations, Leadership and Technology
Phone Number 844-4460 AU Email jws0089@auburn.edu

c. Project Personnel (other PI) - Identify all individuals who will be involved with the conduct of the research and include their role on the project. Role may include design, recruitment, consent process, data collection, data analysis, and reporting. Attach a table if needed for additional personnel.

Personnel Name Degree (s)
Rank/Title Department/School
Role
AU affiliated? YES NO If no, name of home institution
Plan for IRB approval for non-AU affiliated personnel?

Personnel Name Degree (s)
Rank/Title Department/School
Role
AU affiliated? YES NO If no, name of home institution
Plan for IRB approval for non-AU affiliated personnel?

Personnel Name Degree (s)
Rank/Title Department/School
Role
AU affiliated? YES NO If no, name of home institution
Plan for IRB approval for non-AU affiliated personnel?

d. Training - Have all Key Personnel completed CITI human subjects training (including elective modules related to this research) within the last 3 years? YES [checked] NO

The Auburn University Institutional Review Board has approved this Document for use from 08/04/2020 to Protocol # 20-368 EX 2008

EXEMPTION REVIEW APPLICATION

For information or help completing this form, contact: **THE OFFICE OF RESEARCH COMPLIANCE,**
Location: 115 Ramsay Hall **Phone:** 334-844-5966 **Email:** IRBAdmin@auburn.edu

Submit completed application and supporting material as one attachment to IRBsubmit@auburn.edu.

1. PROJECT IDENTIFICATION

Today's Date 7/23/2020

a. Project Title Evaluating Student Satisfaction with Remote Learning in a Veterinary School

b. Principal Investigator Sara-Louise Newcomer Degree(s) DVM
Rank/Title Graduate Clinical Lecturer Department/School Department of Clinical Sciences/Academic Affairs, College of Vet Med
Phone Number 352-206-4170 AU Email sln0005@auburn.edu

Faculty Principal Investigator (required if PI is a student) James. E. Witte
Title Professor Department/School AVN Dept./CLA
Phone Number 844-1905 AU Email witteje@auburn.edu

Dept Head James Satterfield Department/School Educational Foundations, Leadership and Technology
Phone Number 844-4460 AU Email jws0089@auburn.edu

c. Project Personnel (other PI) – Identify all individuals who will be involved with the conduct of the research and include their role on the project. Role may include design, recruitment, consent process, data collection, data analysis, and reporting. Attach a table if needed for additional personnel.

Personnel Name _____ Degree (s) _____
Rank/Title _____ Department/School _____
Role _____
AU affiliated? YES NO If no, name of home institution _____
Plan for IRB approval for non-AU affiliated personnel? _____

Personnel Name _____ Degree (s) _____
Rank/Title _____ Department/School _____
Role _____
AU affiliated? YES NO If no, name of home institution _____
Plan for IRB approval for non-AU affiliated personnel? _____

Personnel Name _____ Degree (s) _____
Rank/Title _____ Department/School _____
Role _____
AU affiliated? YES NO If no, name of home institution _____
Plan for IRB approval for non-AU affiliated personnel? _____

d. Training – Have all Key Personnel completed CITI human subjects training (including elective modules related to this research) within the last 3 years? YES NO

**Allow Space for the
AU IRB Stamp**

Is this project funded by an external sponsor? YES No If YES, provide the name of the sponsor, type of sponsor (governmental, non-profit, corporate, other), and an identification number for the award.

Name _____ Type _____ Grant # _____

f. List other AU IRB-approved research studies and/or IRB approvals from other institutions that are associated with this project.

N/A

2. Mark the category or categories below that describe the proposed research:

1. Research conducted in established or commonly accepted educational settings, involving normal educational practices. The research is not likely to adversely impact students' opportunity to learn or assessment of educators providing instruction. 104(d)(1)
2. Research only includes interactions involving educational tests, surveys, interviews, public observation if at least ONE of the following criteria. (The research includes data collection only; may include visual or auditory recording; may NOT include intervention and only includes interactions). **Mark the applicable sub-category below (i, ii, or iii).** 104(d)(2)
- (i) Recorded information cannot readily identify the participant (directly or indirectly/linked); **OR**
- surveys and interviews: no children;
 - educational tests or observation of public behavior: can only include children when investigators do not participate in activities being observed.
- (ii) Any disclosures of responses outside would not reasonably place participant at risk; **OR**
- (iii) Information is recorded with identifiers or code linked to identifiers and IRB conducts limited review; no children. **Requires limited review by the IRB.***
3. Research involving Benign Behavioral Interventions (BBI)** through verbal, written responses (including data entry or audiovisual recording) from adult subjects who prospectively agree and ONE of the following criteria is met. (This research does not include children and does not include medical interventions. Research cannot have deception unless the participant prospectively agrees that they will be unaware of or misled regarding the nature and purpose of the research) **Mark the applicable sub-category below (A, B, or C).** 104(d)(3)(i)
- (A) Recorded information cannot readily identify the subject (directly or indirectly/linked); **OR**
- (B) Any disclosure of responses outside of the research would not reasonably place subject at risk; **OR**
- (C) Information is recorded with identifiers and cannot have deception unless participant prospectively agrees. **Requires limited review by the IRB.***
4. Secondary research for which consent is not required: use of identifiable information or identifiable bio-specimen that have been or will be collected for some other 'primary' or 'initial' activity, if one of the following criteria is met. Allows retrospective and prospective secondary use. **Mark the applicable sub-category below (I, ii, iii, or iv).** 104(d)(4)
- (i) Biospecimens or information are publically available;
- (ii) Information recorded so subject cannot readily be identified, directly or indirectly/linked; investigator does not contact subjects and will not re-identify the subjects; **OR**

activities and purposes" (does not include biospecimens (only PHI and requires federal guidance on how to apply); OR

- (iv) Research information collected by or on behalf of federal government using government generated or collected information obtained for non-research activities.

- 5. Research and demonstration projects which are supported by a federal agency/department AND designed to study and which are designed to study, evaluate, or otherwise examine: (i) public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs. (must be posted on a federal web site). 104(d)(5) (must be posted on a federal web site)

- 6. Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture. The research does not involve prisoners as participants. 104(d)(6)

New exemption categories 7 and 8: Both categories 7 and 8 require Broad Consent. (Broad consent is a new type of informed consent provided under the Revised Common Rule pertaining to storage, maintenance, and secondary research with identifiable private information or identifiable biospecimens. Secondary research refers to research use of materials that are collected for either research studies distinct from the current secondary research proposal, or for materials that are collected for non-research purposes, such as materials that are left over from routine clinical diagnosis or treatments. Broad consent does not apply to research that collects information or biospecimens from individuals through direct interaction or intervention specifically for the purpose of the research.) **The Auburn University IRB has determined that as currently interpreted, Broad Consent is not feasible at Auburn and these 2 categories WILL NOT BE IMPLEMENTED at this time.**

***Limited IRB review – the IRB Chairs or designated IRB reviewer reviews the protocol to ensure adequate provisions are in place to protect privacy and confidentiality.**

****Category 3 – Benign Behavioral Interventions (BBI) must be brief in duration, painless/harmless, not physically invasive, not likely to have a significant adverse lasting impact on participants, and it is unlikely participants will find the interventions offensive or embarrassing.**

3. PROJECT SUMMARY

a. Does the study target any special populations? (Mark applicable)

- Minors (under 18 years of age) YES NO
- Pregnant women, fetuses, or any products of conception YES NO
- Prisoners or wards (unless incidental, not allowed for Exempt research) YES NO
- Temporarily or permanently impaired YES NO

b. Does the research pose more than minimal risk to participants? YES NO

Minimal risk means that the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or test. 42 CFR 46.102(i)

c. Does the study involve any of the following?

00105100

- Procedures subject to FDA regulations (drugs, devices, etc.) YES NO
- Use of school records of identifiable students or information from instructors about specific students. YES NO
- Protected health or medical information when there is a direct or indirect link which could identify the participant. YES NO
- Collection of sensitive aspects of the participant's own behavior, such as illegal conduct, drug use, sexual behavior or alcohol use. YES NO
- Deception of participants YES NO

4. Briefly describe the proposed research, including purpose, participant population, recruitment process, consent process, research procedures and methodology.

The purpose of the study is to examine the satisfaction of veterinary students who were taught through remote learning for a portion of one semester (Spring 2020). This study also seeks to examine student satisfaction when comparing two grade levels of students taught by remote learning during the same semester (semesters 2 and 4 in the Auburn University College of Veterinary Medicine (AUCVM) curriculum). This study also examines student satisfaction when considering both the course characteristics and the instructor attributes, to determine if there is any relationship, in particular considering that this semester was started in the classroom and due to the pandemic, required to be completed through remote learning.

The proposed research seeks to utilize the results from the end-of-semester evaluations that are distributed to all students in the AUCVM curriculum. Those who were affected by the dismissal from on-campus classes to remote learning were students in the 1st and 2nd years of the curriculum, in their 2nd and 4th semesters, respectively. The plan of the study is to use the results from all of the end-of-semester evaluations that were completed (for Spring 2020). Permission was requested and granted according to the Acting Associate Dean for Students and the Dean of the Auburn University College of Veterinary Medicine. This permission was granted with the

5. Waivers

Check any waivers that apply and describe how the project meets the criteria for the waiver. Provide the rationale for the waiver request.

- Waiver of Consent (Including existing de-identified data)
- Waiver of Documentation of Consent (Use of Information Letter)
- Waiver of Parental Permission

All retrospective information will be de-identified.

This is considered secondary research and consent is not required. Data have been de-identified and participants will not be contacted in any way. Using end-of-course evaluations from Spring semester courses where individuals are not identifiable.

6. Describe how participants/data/specimens will be selected. If applicable, include gender, race, and ethnicity of the participant population.

Participants were self-selected because of being a 1st or 2nd year veterinary student affected by their spring semester 2020 transitioning after Spring Break from face-to-face learning to remote learning for the remainder of the semester. Additionally, students are not required to complete the end-of-semester evaluations for their courses, so the data are collected specifically only from those individuals who completed the evaluation. Additionally, the data were provided with identifiers removed so as not to provide any information on the individual student, the course, or the course instructor.

7. Does the research involve deception? YES NO If YES, please provide the rationale for deception and describe the debriefing process.

6. Describe why none of the research procedures would cause a participant either physical or psychological discomfort or be perceived as discomfort above and beyond what the person would experience in daily life.

N/A Data are pre-existing from routine end-of-course surveys.

9. Describe the provisions to maintain confidentiality of data, including collection, transmission, and storage.

The data were previously collected through anonymous student end-of-semester evaluations. Prior to receiving the data set, all identifying information associated with the courses or course instructors were removed.

10. Describe the provisions included in the research to protect the privacy interests of participants (e.g., others will not overhear conversations with potential participants, individuals will not be publicly identified or embarrassed).

N/A

11. Will the research involve interacting (communication or direct involvement) with participants?
 YES NO If YES, describe the consent process and information to be presented to subjects.
This includes identifying that the activities involve research; that participation is voluntary;
describing the procedures to be performed; and the PI name and contact information.

08/05/20

page 7 of 8

In the space below, provide any additional information you believe may help the IRB review of the proposed research. If attachments are included, list the attachments below. Attachments may include recruitment materials, consent documents, site permissions, IRB approvals from other institutions, etc.

- Additional page containing rest of answer to question 4. (attachment 1)
- Copy of end-of-semester evaluation (attachment 2)
- Copy of MOU between researcher and the Acting Associate Dean of Academic Affairs, AUCVM (attachment 3)
- CITI document-Sara-Louise Newcomer (attachment 4)
- CITI document-James E. Witte (attachment 5)

Principal Investigator's Signature Sara-Louise Newcomer Digitally signed by Sara-Louise Newcomer
DN: cn=Sara-Louise Newcomer, o=Middlebury University,
ou=Department of Clinical Sciences, College of Veterinary
Medicine, email=slnewcom@middlebury.edu, c=US
Date: 2020.08.02 14:41:05 -0500 Date 08/02/20

If PI is a student,
Faculty Principal Investigator's Signature James E. Witte Digitally signed by James E.
Witte
Date: 2020.08.07 09:28:02
-0500 Date 8/7/2020

Department Head's Signature James Satterfield Digitally signed by James
Satterfield
Date: 2020.08.12 11:37:58 -0500 Date 8/12/2020

Page 4, question 4 continued...

Auburn University College of Veterinary Medicine. This permission was granted, with the agreement that all data will be used anonymously and there will be no linkage or identifiers to the individual students, course instructors or courses. Therefore the population was 1st and 2nd year AUCVM students who completed the end-of-semester evaluations. There was no recruitment process as this was a retrospective study using anonymous results.

Research procedures and methodology:

Data for this survey is based on existing data of which the demographics will be analyzed using summative techniques. Predictive data will also be examined using analysis of variance.

Veterinary Medicine Course End-of-Semester Evaluation for Contingent response courses
(those that were affected by COVID-19 dismissal)

Course questions

- 1) Course objectives were clear. 6 pt Likert scale
- 2) Course material was presented in an appropriate order. 6 pt Likert scale
- 3) Grading techniques were clear and fair. 6 pt Likert scale
- 4) Overall, the course contributed significantly to my education. 6 pt Likert scale
- 5) Comments regarding the course. Comment box

Instructor questions

- 1) The instructor explained course material clearly. 6 pt Likert scale
- 2) The instructor encouraged me to think critically. 6 pt Likert scale
- 3) The instructor created a conducive atmosphere for learning. 6 pt Likert scale
- 4) The instructor enhanced my interest in the subject. 6 pt Likert scale
- 5) Overall, the instructor was an effective teacher. 6 pt Likert scale
- 6) Comments regarding the instructor or their part of the course. Comment box

Remote Learning Questions

- 1) I prefer streaming live lectures rather than watching recorded lectures. 6pt Likert scale
- 2) I prefer a single 50-minute lecture rather than multiple shorter lecture segments. 6pt Likert scale
- 3) The tools available to me for online learning (e.g., device, modem, internet speed, etc.) were adequate for the transition to remote instruction. 6pt Likert scale
- 4) The support I received for online learning (IIT, course coordinator/instructors, CVM administration, etc.) was adequate for the transition to remote instruction. 6pt Likert scale
- 5) The remote/online course materials supported my learning. 6pt Likert scale
- 6) My preferred option for communication is: (rank list)
- 7) Please list positive attributes/positives about the online portion of this course. Comment box
- 8) Please describe what could be improved if this course needs to be taught online again in the future. Comment box

6-point likert

[SA] Strongly agree=6

[A] Agree=5

[SA] Slightly agree=4

[SD] Slightly disagree=3

[D] Disagree=2

[SD] Strongly disagree=1



AUBURN
UNIVERSITY

COLLEGE OF VETERINARY MEDICINE
ACADEMIC AFFAIRS
MEMORANDUM

TO: Sarah-Louise Newcomer
CC: Calvin Johnson, Dean
FROM: Benson Akingbemi, Acting Associate Dean for Academic Affairs *BTAkingbemi*
DATE: June 24, 2020
SUBJECT: Request to use end of semester evaluations and data

This memo is in reference to your ongoing graduate degree program in Adult Education at Auburn University. Your request to use end-of-semester course assessments and data collected during the spring 2020 semester related to remote instruction necessitated by the COVID-19 pandemic has been considered. The increasing use of online teaching platforms is an important contemporary topic. It is likely that many schools that embraced online teaching platforms this past semester will continue to use these platforms to varying degrees for the foreseeable future. Therefore, results of your analysis may impact efforts to bring efficiency to use of online educational programs, including our professional curriculum at the Auburn University College of Veterinary Medicine (AUCVM).

Importantly, the Office of Academic Affairs at the AUCVM notes that data will be used anonymously and there will be no linkage or identifiers to the individual students, course instructors or courses. In addition, you will obtain Institutional Review Board (IRB) approval prior to data analysis.

This memo serves as a notice of approval of your request. Let us know if we can be of any further assistance regarding your thesis work.

My best wishes for good luck and success in your graduate degree program.

Appendix B: End-of-Semester Evaluation

Veterinary Medicine Course End-of-Semester Evaluation for Contingent response courses

(those that were affected by COVID-19 dismissal)

Course questions

- 1) Course objectives were clear. 6 pt Likert scale
- 2) Course material was presented in an appropriate order. 6 pt Likert scale
- 3) Grading techniques were clear and fair. 6 pt Likert scale
- 4) Overall, the course contributed significantly to my education. 6 pt Likert scale
- 5) Comments regarding the course. [Comment box]

Instructor questions

- 1) The instructor explained course material clearly. 6 pt Likert scale
- 2) The instructor encouraged me to think critically. 6 pt Likert scale
- 3) The instructor created a conducive atmosphere for learning. 6 pt Likert scale
- 4) The instructor enhanced my interest in the subject. 6 pt Likert scale
- 5) Overall, the instructor was an effective teacher. 6 pt Likert scale
- 6) Comments regarding the instructor or their part of the course. [Comment box]

Remote Learning Questions

- 1) I prefer streaming live lectures rather than watching recorded lectures. 6pt Likert scale
- 2) I prefer a single 50-minute lecture rather than multiple shorter lecture segments. 6pt Likert scale
- 3) The tools available to me for online learning (e.g., device, modem, internet speed, etc.) were adequate for the transition to remote instruction. 6pt Likert scale
- 4) The support I received for online learning (IIT, course coordinator/instructors, CVM administration, etc.) was adequate for the transition to remote instruction. 6pt Likert scale
- 5) The remote/online course materials supported my learning. 6pt Likert scale
- 6) My preferred option for communication is: (rank list)
- 7) Please list positive attributes/positives about the online portion of this course. [Comment box]
- 8) Please describe what could be improved if this course needs to be taught online again in the future. [Comment box]

6-point Likert

[SA] Strongly agree=6

[A] Agree=5

[SA] Slightly agree=4

[SD] Slightly disagree=3

[D] Disagree=2

[SD] Strongly disagree=1