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The Effects of Videocasts on Student Learning in Medical Health Science Discipline

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THE EFFECTS OF VIDEOCASTS ON STUDENT LEARNING

IN A MEDICAL HEALTH SCIENCE DISCIPLINE

By

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A Dissertation Submitted in Partial Fulfillment of
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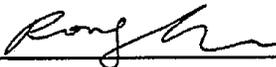
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ABSTRACT

Jessica Viana, MEd, ATC

THE EFFECTS OF VIDEOCASTS ON STUDENT LEARNING

IN A MEDICAL HEALTH SCIENCE DISCIPLINE

Dissertation directed by Dr. Rong Chen

This quantitative study examines the effects of videocasts on student learning in a medical healthcare science discipline. The didactic nature of educational strategies is necessary in preparing future healthcare professionals. However, the manual skills cannot be reviewed once the student has left the classroom. Incorporating the use of videocasts into the resources for student learning adds another means for the students to follow and retain the skills acquired during class. Athletic training students in two accredited programs performed two class presentations over the course of one semester, one in the traditional format and one with the use of videocasts. The instructors, peers and the presenters evaluated each of the two presentations and their formats via survey. The surveys assessed the presenters' skills, understanding of the topic, and relevance of the information being presented based on the format. Comparing the scores of the three evaluations helped to determine the students' mastery of the knowledge between the two presentation formats. Based on these findings, recommendations to incorporate more videocasting into the classroom may be made in order to further the retention of hands-on skills taught in medical healthcare science programs.

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Dedication

This degree would not have been possible without my family. I owe these letters to my husband, children, parents and my sister because they have been there every step of the way. They have listened to me vent to an innocent inquiry of "how is everything going with your dissertation?" not realizing what they may be getting themselves into. They have picked me up from every kick that has knocked me down. And they have made sure to let me know how proud they are of all my accomplishments.

To my Mom and Dad, you two have no one else to blame but yourselves for my need to continually take on projects and get you involved. You have taught me to always have a five-year plan and tackle what needs to be done in order to make it happen. And despite my tendency to procrastinate, I still have somehow found a way to get this done on time… see I told you I work better under pressure.

To my gorgeous sister Marcy, I cannot imagine a more perfect friend to have by my side each and every day. I know at times I was that annoying little sister, but it was only because I wanted to be just like you and make you proud. Our lives are so different these days, but I am so glad that you and I have continued to grow together and can still look at each other and know exactly what the other person is thinking.

And last but certainly not least by any means, to my amazing friend, partner, and husband Steven. It seems just like yesterday that I was giving you the brush off in college with your rival college shirt and your me too car, but who knew that day that you and I would be where we are now. I could go on forever and sing your praises, but technically this is about me… In all seriousness, there are no words to describe what you have done for me, to allow me to make this dream of mine come true. You have dealt with the roller coaster of emotions that have come

along with this and I would not have been able to do this without you. The one thing I could always count on was you, and the level of comfort that comes along with that is priceless. You have earned this degree right along with me and I want you to know that your unconditional love means the world to me. Our children are so lucky to have such an amazing father and I am so happy I can share this with all three of you.

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Chapter I

INTRODUCTION

Historically, lecturing has been the primary mode of teaching. At times there may have been a negative perception towards lecturing because student involvement can be limited as the teacher is trying to convey the information. Different instructional styles have attempted to either replace or supplement the lecture, but have not withstood the test of time. Moore (2008) wrote, "lectures can provide important signposts to students, that explain the rules of engagement that many of them find it otherwise difficult to learn, and that helps them to understand the areas and tasks that they need to focus on most in order to navigate their learning experiences more successfully" (p. 17). The traditional lecture has sustained its place in the classroom and still possesses some of the core components proven to foster the learning environment. In addition to presenting new information, lectures can help make connections to preexisting knowledge, as well as relate to real life examples that can aid in practical application (McGarr, 2009). However, lectures have a tendency to allow students to remain passive learners, which means they have limited cause to apply themselves critically.

In Chickering and Gamson's *The Seven Principles for Good Practice in Undergraduate Education* (1987), the principles discussed support students developing their skills to become more active learners, rather than passive ones, which are more common within the traditional lecture style of teaching. An all too common pitfall in education exists when there is disconnect between the information presented and the ability of the student to apply the information in a practical setting. Lectures tend to focus on the teacher, not the student, and do not emphasize critical thinking or analysis of the

content that is being presented (Armstrong, Tucker, & Massad, 2009). "Research shows that student involvement, hands-on projects and teamwork are successful pedagogical approaches" (Armstrong, Tucker, & Massad, 2009, p. 80).

One pedagogical approach is that of the podcast. In the early 1990s, podcasting had become such an integral part of our culture and a common vocabulary word that it was added to the New Oxford American Dictionary (Honan, 2005). The term podcast was created as a derivative of the two words "iPod" and "broadcast," largely due to the popularity of Apple's iPod MP3 player that cornered the technology market of playing media on the go. The availability of the MP3 file format is how podcasting was able to make its debut onto the educational scene. The MP3 player is a personal portable device that allows a person to listen to music, audio feeds, and in this case, retrieve published information for educational purposes. "Typically, the reason to create an audio podcast rather than an enhanced podcast is the size of the file and the amount of time required to download the content. Podcasts are essentially audio and/or video files that are published to the Internet with an RSS (Real Simple Syndication) feed attached to them" (Bennett, 2006, p. 30). In 1991, MP3 file sizes were significantly smaller than the previous attempts, which led to a more efficient, download time as well as a better quality audio feed. Along with the increase in dial-up speed, the popularity of podcasting skyrocketed because of the user-friendly downloading capabilities and the larger storage capacity of the MP3 players. At the turn of the new millennium, the technology industry fully began to realize the platform that podcasting created, and companies began supporting software to manage MP3s and RSS syndication. Of that software, the most popular were Apple's

iTunes and RealPlayer, which supported software for managing the MP3s and the RSS syndication.

Content software that enables the editing of audio or video also can create podcasts or videocasts from that previously recorded audio/video. It is then subsequently uploaded to a web server. The next simple step in this process requires creating the RSS feed, which is the web format that the podcast or videocast needs to be in order to be published online. There is a variety of software that can aid in this process, which can automatically create the RSS feed once the media file is created. Following the RSS-feed creation, the user may upload the podcast or videocast to a web-hosting service. Most universities have a campus-wide server, i.e. Blackboard or WebCT, which allows both instructors and students to publish information that can be accessed by those with appropriate permission. Once the file has been downloaded, it can be stored electronically, allowing the user to access it at any time. The inception of modern technology allows virtually any mobile device, MP3 player, iPod, PDA (personal data assistant), or computer to replay the content. The MP3 file format allows accessibility at any time to anyone capable of getting online to retrieve data with their respective electronic device.

Podcasting became a brand new method of streaming information to the general public. Educators also found this to be a vital asset as they began to discover ways to supplement their classroom materials. By 2005 nearly 22 million Americans owned MP3 players and about six million were regularly downloading podcasts for various interests (Hew, 2009). Recently the use of videocasts has been added to this type of content delivery, with the difference being instead of an audio file, it is a video file. This type of

presentation allows for demonstration of skills when needed, which is beneficial to medical and healthcare education programs. The ease of access, simplicity, and versatility that this type of technology provides propelled podcasting to the popularity it has today. It has been a combination of all the above-mentioned factors that has led to the growing number of topics and users, vaulting podcasts to an essential part of nearly every industry. "Since late 2002, various courses at Georgia College and State University, including a number of study-abroad courses, have been 'iPod enhanced' to include a diverse range of audio material ranging from lectures and audio books to language-study material and music" (Lee, McLoughlin, & Chan, 2008, p. 503).

In a rather short period of time, podcasting and more specifically videocasting have become part of many educators' toolbox and challenge the traditional lecture, as we know it today. Duke University, Princeton University, Stanford University, and University of California – Berkeley have all embarked on projects to determine if podcasts will aid in their students' learning (Armstrong, Tucker, & Massad, 2009). Duke University distributed iPods to all 1,600 first-year students in 2004 to encourage the use of technology in new ways (Duke University, 2006). The university wanted to determine if podcasts were beneficial in promoting technological initiatives that they were trying to establish. The study included 60% of the first year students, who found it very helpful in being able to return to lectures they may not have had access. The goal was to encourage the use of iPod technology in new learning strategies.

Similarly, Princeton University created a university-wide channel that started with only 20, recorded podcasts in 2005 from events all over the campus; the podcast library expanded to 150 clips in only a short six-month period. The University of Leeds also

used podcasting with first-year medical students to present information from lectures and textbooks as well as recordings of heart sounds for further review by the students outside of the classroom. In a study by Huntsberger and Stavistsky in 2007 the use of podcasting was examined and of the 209 responses, 87% listened to the podcasts during their regular study sessions, not while performing other tasks (McGarr, 2009).

An additional area that has been examined is the context in which students access the podcasts, for example during other activities like working out or commuting, as well as at what point during their semester the podcasts are being used to aid in their learning acquisition. In addition podcasts are being used to evaluate the learning outcomes of the students by having another instructional format available to them for the courses. At Otterbein College, two classes were compared: a nursing class of 63 students in 2007 was compared to a nursing class of 57 students in 2008; the course content was exactly the same. The 2007 class was presented in the traditional lecture style and the 2008 class was presented the same content using the podcast format. The same faculty and exam was used to compare and evaluate the scores between the two years of students (Vogt, Schaffner, Ribar, & Chavez, 2010). This particular study showed no statistical significant difference in learning acquisition between the two classes.

Formal lecture has long been the mainstay strategy within the confines of the classroom walls; however, technological advances, specifically podcasting, have allowed the educator to reach past those boundaries and provide information or materials to the students at the touch of their fingertips. "Lectures as educational episodes are still likely to represent among the most robust methodologies used by institutions to educate their students (McGarr, 2009, p. 310). However, research has shown that technology is

changing the landscape within the classroom. "Many students expect instructors to integrate Internet technologies, such as online learning management systems and collaborative Internet technologies, into the traditional face-to-face classes to enhance learning experience, believing those tools make the educational experience more convenient and educationally effective" (Salaway & Caruso, 2008, p. 4).

The types of students that are currently in universities as well as future students are technologically savvy. These generations have been labeled the Millennials or the Net Gens. "Olsen describes Millennials as teens and post-teens raised in the sensory-inundated environment of digital technology and on-demand mass media" (Hirtle & White, 2006, p. 89). With the availability of information at their fingertips, students are challenged to maintain the ability to expand on the information that is presented in the classroom. The students seem to show better retention when they can learn from their peers, apply it outside of the classroom and learn through discovery. The current generation of professors in colleges and universities is challenged by the technologies with which their students have been raised and they therefore, have to increase the speed of the learning curve to keep the students engaged. Podcasts allow for information to be updated as frequently as necessary, as opposed to waiting for the next class meeting, because information can be put online for students to access as needed. In addition to the professors producing the podcasts, the students can create them for their peers to access. Multiple goals are accomplished with student-generated podcasts. One is the acquisition of the technological process of creating a podcast, and the other, better comprehension of the topic they are discussing. In addition, when working with a group, students acquire interpersonal skills for managing group work.

Podcasting fits into the needs of the Millennials or the Net Gens with its counterparts, which include digital information, connectivity, immediate access, and virtual communication. Current students are not only accessing more resources with the click of a mouse, they are expanding their search beyond the local libraries, professors, and classmates. The rate at which information can be delivered to those searching for it is as fast as the Internet downloading speed. Hirtle and White (2006) reported "educators – responding to the ever-shifting marketplace and concerned about helping students become empowered, self-learning citizens – must begin to acknowledge the role that podcasting (and other personally empowering technologies) might play in contemporary experience." Educators need to embrace the technology that is going to lure their students in, but also remain the expert above all the information that students are accessing. There is a need to educate the students not only on content, but also on the techniques needed to eliminate the material that is not credible and look past all of the excess information. There seems to be a positive response by both the instructors and the students with the incorporation of podcasts which leads to the need to determine its effects on the learning outcomes with this addition. Responding to the changing culture of the classroom as well as the needs of the students allows for a more optimal learning environment.

Problem Statement

This dissertation focuses on podcasting within the medical healthcare sciences, i.e. nursing and athletic training, because of the implications it can have to the curriculum and how clinical skills are presented to the students. The didactic nature of the medical health sciences courses make it necessary to not only lecture to the students about the skills, but also to demonstrate the skills which make it difficult for the students to review

at a later time. Finding teaching strategies to make hands-on clinical skills component of the courses available to the students would make the in class learning opportunities more meaningful and relevant to the practical application. There is also significant use of videocasting among students in these particular educational programs. Other areas of study include business and technology, more specifically information technology departments.

Research in this field is warranted because many institutions need to determine and evaluate the risk versus reward that podcasting offers in medical health sciences. The risks can include financial support, technological support, or a minimally effective teaching strategy. "While podcasting has the potential to enhance the students' learning experience, it also can reinforce the worst aspects of the transmission model of learning. For this reason, future use of these technologies should be learner led, rather than technology led" (McGarr, 2009, p. 320). The transmission model is the instructors' role is to present the information and the students' role is to receive the information and utilize it as appropriate. Schools must evaluate all technological innovations for their worth, both fiscally and practicality.

Videocasts can act as an extension of the classroom. Either in preparation for a lesson, reiteration of a skill demonstrated, or as a resource for others not even in the same classroom, videocasts can broaden the resources available to educators and students. The voice that is presenting the information, student or teacher, is very powerful in how well a concept will be absorbed. The ability to replay or expand upon a lesson beyond the classroom can be helpful in the mastery of a lesson or skill.

Educators need to adapt to the multiple types of learners, making the learning experiences more meaningful, particularly for critical thinking skills. Faculty members are continually challenging themselves to cater to students' needs and have the versatility to provide information on a variety of levels. Podcasting has demonstrated the versatility that educators need to engage their students. Incorporating the use of technology in the classroom is the current trend that is attempting to take the focus off of the lecture.

The use of podcasts can be one way to combine the use of lecture, which is to transfer knowledge and initiate investigation for the students. If the use of technology, and in particular the use of podcasts, becomes commonplace on a campus then the results on students' learning could really make a vast impact for the positive. This technology can be found in a multitude of formats, including "administrative podcasts (general information, guides), special lecture series (guest lectures, commencement lectures, etc.), and classroom podcasts (anything involving curriculum teaching)" (Heilesen, 2010, p. 1063). Although there are far fewer research studies strictly from the learner's perspective, there are some studies that take the more creative, collaborative approach with students creating the podcasts to help reinforce and apply the learned skill. As with many innovations, it is noteworthy to examine the academic benefits that may or may not occur with this new strategy. Integrating a new technique to stay with current teaching trends is not always reason enough without evidence of the yielded results.

An examination of the use of videocasts in conjunction with traditional lectures will be helpful for professors to determine if the use of this type of technology aids in a students' learning or is more of an educational trend that may not last. As shown throughout the research discussed, there has been a significant change in the direction of

the instructional methods on many different campuses. The focus of research has traditionally been on the students' perception of videocasting's role in the classroom, but little has been done on the learning experience and the outcomes. Several schools have made significant initiatives and have invested time and money incorporating the use of videocasts with minimal research on the effects it is having on the students' learning environment. Evidence-based research on the use of this instructional technique would assist in the decision-making process of both individual professors as well as campus-wide programs. This researcher will attempt to determine if the use of videocasts in the classroom is an effective tool in reference to impacting a student's learning experience.

Purpose Statement

The use of videocasting in healthcare sciences has increased due to the didactic nature of the material being taught in the classroom. In 2002 Weidner described athletic training education as the process of attaining relevant psychomotor, critical thinking, decision-making, and professional skills through time spent in the clinical setting with patients. Clinical education involves a transfer of knowledge, and entails the ability to apply learned concepts in various, sometimes unfamiliar, situations (Harrelson, 2002). The combination of both lectures and clinical laboratory skills make learning experiences more effective in helping understand the application of the theory behind the material. Lecture-style courses allow for students to take notes, refer to handouts, supplement with the textbook or additional resources, and utilize the professor for further clarification. Laboratory classes are not as easily recorded and can leave the student in search of a supplementary resource to replicate the didactic skills exemplified in class. Videocasting allows students to view a skill or series of skills when needed outside of the classroom. In

accredited athletic training programs, large portions of classes have a laboratory component specifically dedicated to instructing and practicing clinical skills ranging from anatomy palpations to therapeutic modalities and rehabilitation for injuries.

The National Athletic Trainers' Association Competencies are responsible for the requirements that athletic training programs must follow. The addition of the Clinically Integrated Proficiencies, evidence-based practice, as well as the focus on critical thinking skills, has shifted the focus from basic recall of information to more of the application of skills with the guidance of instructors much like the medical school model (NATA, 2011). Manspeaker (2010) noted that the, "mastery of content knowledge must begin with simple principles and develop to more advanced skills of evaluation, in accordance with Bloom's taxonomy" (Manspeaker & Van Lunen, 2010, p. 58). Mastery learning is seen to be the historical model for athletic training education without the restriction of time and place. This process can be seen in the competency based educational format that athletic training students need to demonstrate proficiency in before they can move on to the next level prior to completion of the program.

Athletic training is a multi-faceted profession that involves a variety of skill acquisition to manage an injured athlete. Therapeutic modalities are one of the tools that athletic trainers use to restore and improve a patient's musculoskeletal well-being. A full semester course, entitled Therapeutic Modalities in Athletic Training Theory and Practice (PE 3504) is dedicated to this information. Through the lectures and lab sessions, a foundation of knowledge and skills necessary to manage musculoskeletal problems using appropriate therapeutic modality principles and techniques is provided.

Therapeutic exercise is another important skill for athletic trainers in restoring and improving a patient's functionality (RDS/PA6, 2010). Therapeutic Exercise (GMAT 6018) is specifically dedicated to this information. In each class, students are responsible for the presentation of a specific therapeutic modality application or therapeutic exercise protocol as well as the research surrounding the use of that particular modality or protocol. The information is presented to the entire class to provide an opportunity for critical thinking and problem solving. Typically, the presentations have been in a traditional format, using PowerPoint and physically demonstrating the application of the modality. However, several years ago, students began recording application techniques using Flipcams, and then projecting the video for the class while providing a verbal explanation of the application. This process allowed for opportunity to critique the student's technique, as the video could be replayed to demonstrate a particular point. With the increased use of podcasting in medical science, however, research is needed to provide empirical evidence for the effectiveness of this type of technology in assisting student learning.

The purpose of this study was to understand the effects of the use of videocast on student learning in athletic training programs by comparing it to the use of the traditional presentation approach. The surveys consisted of questions evaluating the presenter's skills in presenting the information, level of knowledge of the information, and relevance of information to the topic. The research question that guided this study was: Is there a significant difference in response scores between video and traditional presentations among student peer evaluations? Is there a significant difference in response scores between the video and traditional presentations among instructor evaluations? Is there a

significant difference in response scores between the video and traditional presentations among presenter self- evaluations? The total scores of each evaluation were utilized to see if a determination of the effect of the use of videocast on student learning was possible.

This dissertation study attempted to examine the extent to which podcasting is an effective educational tool. For a better understanding of the issue, this study evaluated the peer, self, and instructor evaluation scores from the Fall 2010 GMAT 6018 Therapeutic Exercise, Spring 2011 and 2014 PE 3504 Therapeutic Modalities in Athletic Training Theory and Practice courses to determine if there was a significant difference between the scores for the traditional and videocast presentations. The primary targeted student population of this research was students in the medical health sciences, due to the more common utilization of podcasting and videocasting in these programs, such as nursing and general medical education.

Significance

The use of video- and podcasting in the classroom, while not a new educational process, has not been documented in the athletic training education. In higher education, students in general indicated that while taking courses where lectures were posted to iTunesU, they used that material for review. Studies in nursing education indicate that students liked the availability of podcast lectures. Students found them useful for reviewing material, as well as for reinforcing and clarifying content. They appreciated the ability to access the lectures anywhere and at any time (Forbes & Hickey, 2008). However, students also indicated that there were difficulties with the technology and that the podcasts did not improve the level of teaching (Vogt, Schaffner, Ribar, & Chavez,

2010).

 The findings of this study may provide suggestions from both the practice and research perspectives. First, this research will attempt to inform policy-making and practices at the classroom and institutional levels by demonstrating the level of significance the use of podcasting in the classroom has on skill acquisition. Second, this dissertation will show the contribution of this research project and how it can affect the perception of educators of this instructional technique. The structure of this dissertation will be as follows: Chapter Two first provides a review of related literature and the theoretical framework. Chapter Three discusses the methodology of the research study, including data collection and analytic methods. Finally, the results will be discussed in Chapter Four and then recommendations for future research will be made in Chapter Five.

Chapter II

LITERATURE REVIEW

The use of podcasting as an educational tool in the classroom among institutions of higher education has been examined from several approaches, some overlapping within the same study. It has been examined from the institutional aspect, causing the school to evaluate technology implementation on a broader perspective to keep up with competition. Institutions are utilizing technology not only to attract more students, but to allow more flexibility in and out of class for the students. Podcast usage trends intrigued many researchers and stirred attention to determine when, where, and how students accessed educational material. Researchers were particularly interested in determining the benefits of instructor-generated podcasts as compared to student-generated ones, and the perceptions of each. Finally, the effects of implementing podcasts in the classroom on the learning outcomes were examined to evaluate the results on students' grades with them.

Theories Guiding the Studies of Technology Effects on Student Learning

Theorists, Walter Barbe and Raymond Swassing, have labeled students by the different ways in which they learn to help educators better understand the teaching approach that may make the learning experience most effective (Barbe, Swassing, & Milone, 1979). The most common descriptors of the four types of learners are the visual learner, the auditory learner, and the kinesthetic learner. Understanding the types of learners that make up a classroom can be helpful for the instructor while planning lessons and looking into new or a variety of teaching strategies. "The evidence suggests that there are multiple pedagogical possibilities inherent in a technology-based, student-centered

learning environment. Yet the success of these environments rests on a teacher's ability to recognize that all learners develop a preferred and consistent set of behaviors or approaches to their own learning and have individual needs that can be provided for through a mediated, technology-based, student-centered environment" (Gibson, 2001, p. 57).

Another theoretical approach to integrating technology in the classroom is the technological pedagogical contact knowledge (TPACK) (Graham, 2011). The TPACK framework has evolved into a more content specific orientation to technology integration, which has been achieved by Shulmans's addition of technological knowledge to the existing pedagogical content knowledge (Graham, 2011). There are three core categories of knowledge: pedagogical knowledge, content knowledge, and technological knowledge. The overlapping of these three has created four additional types of knowledge: pedagogical content knowledge, technological pedagogical knowledge, technological content knowledge, and technological pedagogical content knowledge (Graham, 2011). The TPACK framework is depicted in Figure 1
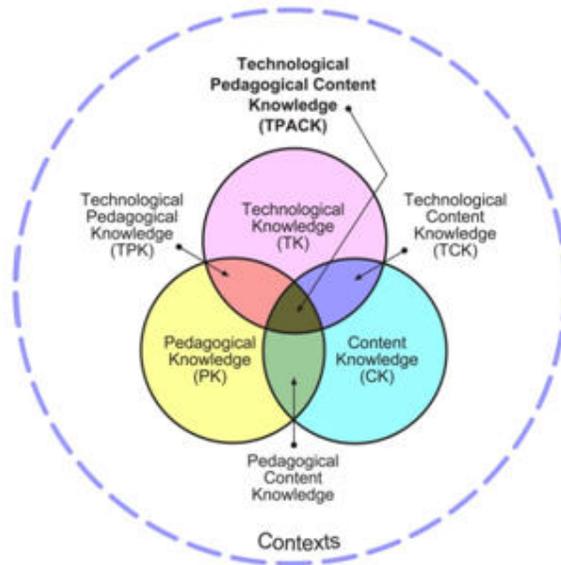
Figure 1.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. Teachers College Record, 108(6), 1017-1054.

Overall educators find the TPACK framework helpful in guidance for the integration of both pedagogical content and technology content. One major limitation has been keeping up with the technology, which then leads to the evolution of the definitions of terms. Educators find this also a useful tool to guide training of future educators who are looking to integrate technology into the classroom. The successful addition of these new strategies needs to not overshadow the content and is a concern of most. Appropriate integration of technology is an essential component to provide the best opportunity to promote student learning. This model assists educators in ensuring that the use of technology does not impede on the content that is being presented, but it is a tool to aid the students in acquiring the information.

When given the ability to create their own podcasts for informative reference guides, the students must possess a certain level of proficiency within the subject matter. In Armstrong, Tucker, and Massad's study in 2009, they found that "podcasting has limited impact as a mere method of distribution and that the emerging developmental and research direction seems to be learning through creating podcasts and similar, in contrast to learning from podcasts" (p. 81). Catering to the needs of all students and their learning styles can be aided by the use of podcasting regardless of whether they are teacher- or student-generated. Podcasting allows for information to be disseminated in a variety of ways that are different from the traditional lecture.

   Chickering and Gamson (1987) discuss that active learning is a more effective technique, but not one that is easily achieved through the traditional lecture-style classroom format. Student-generated podcasts have recognized to inspire critical thinking skills that are otherwise neglected many typical classrooms. It is of the utmost importance that one can evaluate the use of podcasting in all capacities, which include the substitution, supplemental, or learner-generated format. The combination of all three types of podcasts allows students access to every aspect of the educational content with the touch of their fingertips.

   The Chickering and Gamson theory and the TPACK theory address both angles of incorporating the use of podcasts into the classroom, student needs and instructor guidance. In order to meet the diversity of the students' learning needs, it is important for instructors to determine the appropriate avenues to deliver the information. Podcasting is not only a new instructional technique to address different learners' needs, but it is also addressing the technology that students will experience beyond the classroom and need to

become familiar with its usage. Instructors need to be able to have strategies to

effectively and appropriately incorporate the new technology as to not take away from

the material that is being disseminated. The TPACK model gives guidance on how to

infuse the use of this technology without compromising the importance of the material or

being distracting to the students because they have to focus too much on the technology.

Online courses and universities are the most obvious choice for the need of new

ways to disseminate information to the students for a more meaningful learning

experience, as well as to make a stronger connection to the institution, instructors, and

classmates. One can predict that students who choose distance learning over the

traditional classroom could possibly feel differently about the use of podcasts since they

are choosing to be in the remote classroom; they may find podcasts to be a helpful tool in

replacing the typical lecture format does not exist in the m-learning environment.

Methods of Literature Review

Before a review of the studies on the effects of podcasts on college student

learning, clarification of the methods and scope of the review will be discussed. First, this

literature review was to examine the quantitative studies on the use of podcasts as an

educational tool in higher education, but it does not exclude qualitative studies. Although

the focus of the study was medical health educational programs, the literature review

covers studies based on educational programs in higher education in general, due to the

limited number of studies in medical health research. Studies were reviewed from both

the podcasts that are created by the instructor as well as podcasts created by the student.

Second, the review also included research from countries other than the United

States. The initial search did not discriminate on geographic region, but instead focused

more in the relevancy to the topic of interest. International studies that were included were from England, Australia, Italy, United Kingdom, and Denmark. Due to the predominance of educator-generated studies, there is an imbalance between the educator- and student-generated podcast studies, but there is more overlap between the educator-generated podcast students than there are student-generated podcast studies, leading to decent diversity among the different studies.

Third, studies that were reviewed were from higher education institutions. All types of institutions were included in this review, i.e. online institutions, campus based institutions, or a combination of the two, including both undergraduate and graduate level courses in order to attempt to uncover the most research and allow for a fully comprehensive literature review.

The duration of time the studies were conducted over was not limited. Since podcasts have only been around since the early 1990's, no other documents were found or used prior to that, but as previously mentioned the majority of the studies are from the last ten years, with a strong level of incidence being within the last five years.

Research of the Technology Effects on College Student Learning

This section reviews empirical research that has examined the effects of technology on college students. The recurring themes that have been discovered throughout the literature include institutional aspects, which refer to a campus-wide implementation of podcasting to determine the level of effectiveness it may have on student learning; the capacity in which podcasts have been used; the type of students that are accessing them; when the podcasts are being accessed; and the usefulness to the students either as a revision tool, supplementary tool, or in a more creative manner

(Heilesen, 2010). In addition, the effects of podcasts have also been examined by looking at student learning at the class/course level. There is a focus on podcasting within the medical healthcare sciences, i.e. nursing and athletic training, because of the interest of the reviewer. There is also a significant amount of use among students in these particular educational programs. Other areas of study include business and technology, more specifically information technology departments.

Usage of Podcasts

Educators' usage demonstrated a wide variety of selected information that was available via the podcast for students' access. In these studies, podcasts were found to contain everything from supplemental information and material to a recording of the entire traditional formal lecture from class. The University of Leeds conducted a study that evaluated the usage of podcasts by students in their first year of medical school. The study determined that of the 86 students that were surveyed 60% downloaded podcasts weekly and 21% had a regular subscription to a podcast provider (Koo, & Sandars, 2008). The podcasts included recordings of lectures and of textbooks as well as heart sounds that could be accessed for review outside of the classroom. Aside from the type of material that was included in the podcasts, researchers were also very interested in the frequency with which students downloaded the podcasts.

In a study performed at the University of Michigan with a focus group of 105 students, of which 66.7% responded to the survey, 44% accessed the podcasts very close to the exam period, 26% downloaded them as soon as they were available, and the remainder exhibited sporadic download activity (Koo, & Sandars, 2008). An important point to make note of is the portability of podcasts on an MP3 player which, many

researchers thought would make podcasts more attractive to students. According to the University of Michigan study only 9% listened to it while commuting and 2% at the gym, compared to 75% who listened to it at home (Koo, & Sandars, 2008). Other limiting factors that were mentioned in most of the research were technical difficulties; however, many studies included technical support for students as needed to aid in elimination of the students' fears of a new teaching technique. It was surprising that in many instances, until a particular study had been performed, many of the students indicated they were using podcasts for the first time (Lazzari, 2009).

Podcast Usage and Students' Satisfaction

Podcasting has developed into an extremely diverse educational tool. Along with the diversity that the podcast offers, it is nearly impossible to replicate two courses with similar formats; two professors may have two completely different perspectives on how the podcast can be incorporated into their classroom. Studies examined multiple aspects of the podcasting experience and attempted to categorize the results through the use of surveys with varying types of open-ended questions or short interviews. Researchers compared how and when the students accessed the podcasts, if there was any multitasking that occurred while listening to the podcasts, the type of information available on the podcasts, instructor-generated versus learner-generated formats, and if there was any effect on the attendance rate in the class. There are also a few other topics that were not featured as regularly throughout each individual study, which will be discussed as they surface throughout the review.

Forbes and Hickey (2008) examined the use of podcasts in an undergraduate nursing program in 2006. Instructors began their research by instituting the use of

podcasts over the course of three semesters and identifying five concentration areas to be

examined. These areas of focus included student use of podcasting, listening habits,

perceived effect on learning, impact on class attendance, and choice of classes. This study

had a 68.5% response rate with a sample size of 170 completing the survey. Regarding

student usage, the study found 65% of students accessing the podcasts more than six

times throughout the semester. As for listening habits, 48% of students listened at their

computers, 16% on iPods, and 29% using a combination of the two. The location of

where the listening occurred was mostly at home with 92%, and the rest had less than

50% listening on campus, while commuting, or during other activities. "Students

overwhelmingly perceived that podcasting had a positive impact on their learning in the

course at 92.4%" (Forbes, & Hickey, 2008, p. 226). The reasons ranged from being able

to clarify notes from a particular lecture, in which repetition of the material was useful, to

combining it with all other course materials as a helpful supplementary resource. There

was little to no impact on class attendance and the 11% of whom it did impact noted in

the open-ended questions that it was due to specific situations that did not allow them to

attend.

Finally, 42% of the students noted that they would choose a class that used

podcasting over another because of the positive impact in had on their learning. No effect

sizes were reported for this study. The sample size was fairly large when looking at the

size of the total population, which makes it easier to relate to other nursing programs or

similar allied health programs. The students were enrolled in the six core courses of the

nursing program. This descriptive study examined many aspects of the usage of

podcasting, but it is lacking in the examination of the learning outcomes. It was helpful to

ask the students if they felt that the podcasts had a positive effect on their learning, but there was not evidence if there was any impact on their academic performance. Empirical research is needed for educators to decide to put in the time and resources if there is little to no effect from incorporating podcasts into their classrooms.

The purpose of McKinney and Page's study in 2008 was to "report the outcomes of one pilot project which evaluated nursing students' views on the inclusion of a variety of multimedia resources alongside more traditional teaching approaches to facilitate the learning of pathophysiology" (p. 373). The sample size was derived from students in their final year of an undergraduate nursing sciences program in the United Kingdom in an Applied Biomedical Sciences course. All 125 students enrolled in the course replied to the questionnaire. There were both quantitative and qualitative questions that were examined; their responses net the following results: "The advantages were that of enhanced understanding and convenience, with the disadvantages being issues with lecturer contact and technical difficulties" (McKinney, & Page, 2009, p. 374). A vast majority of participants, 89% of the students felt that the podcasts enhanced their understanding because of the ability to revisit the material as much as they needed. Some of the additional comments included, "You could download the lecture onto the MP3 format to use continuously so I was able to go back over the parts that I did not understand" (McKinney, & Page, 2009, p. 374). Most students felt that the convenience of the podcasts and videocasts was very useful, especially when it was difficult to get to campus. All but five students accessed at least one of the multimedia tools that were made available to them.

The main drawback experienced within this study was the inability to resolve technical difficulties when trying to access the material. This holds true for similar studies that have been reviewed as well. The students' perspective with regards to the ease of use and application, but also from the instructors' vantage point because of the time it takes for them to learn how use the equipment and upload the podcasts so they are available to the students. There were no effect sizes reported, and this descriptive study had a full response rate to the questionnaires; it is not entirely clear as to how this was attained. It is noteworthy that the students found the availability of the tools helpful, but to what extent the effect on their overall learning acquisition was not evaluated; therefore, it is difficult to justify the use of podcasts.

Koo and Sandars (2008) from the University of Washington performed a study and drew their sample from courses in management studies and engineering, giving them a sample size of 41 students. The study examined how they listened to the podcasts, what the reason was for accessing the podcasts, and the perception of the ease of use of the podcasts. A wide variety of topics were made available that ranged from course updates to guest lectures, as well as student-generated presentations. The study found 67% of the students felt that it was very useful to have the podcasts. There were three main reasons why they accessed them, the first was to catch up on missed classes at 81%, the second was students' willingness to prepare for exams with 70%, and the third was to clarify concepts for 50% of the students. As seen with most of the studies, 81% of the students listened to the podcasts at home rather than taking advantage of the portability by taking it out with them or listening while doing something else. There were no effect sizes that were reported for this descriptive study. The sample size seems very small and although

it is from a variety of courses, it would be difficult to make assumptions for a larger

population since it seems to be a very limited sample of a larger population. Students'

responses suggested that the variety of information that was made available was

beneficial, as opposed to just recordings of the lectures as seen in other studies. It seems

that it would have been helpful to examine if there was an effect on learning acquisition

of the students with the additional tools that were made available. As with many of the

studies the how and why the students are accessing the podcasts seems to be the main

focus, but there is little insight as to if the technology is making a positive impact on their

learning.

Lonn and Teasley performed the next study in 2009 at a large American

Midwestern university as they attempted to evaluate the attitudes, perception, and use of

podcasting from both the students' and instructors' perspective. The results from this

study came from two online surveys that were set in two different time periods. The first

survey was sent to both students and instructors throughout the university, which was a

general, information-technology survey that had four questions regarding podcasting and

its application. The second survey was sent to all instructors and students that accessed

iTunesU in a single school year. Given the broad spectrum of participants included in this

survey, it is justifiable to argue this to be an effective sample size to determine the

survey's significance.

The first area of the study examined how often information was either uploaded

or downloaded: 67% of instructors uploaded at least once a week; likewise, only 67% of

the students stated that they downloaded on a regular basis. Both students and instructors

agreed that the most common reason that students downloaded the podcasts was to

review material from the classes they had attended. Lastly, when examining if podcasting improved teaching, learning, and achievement, the results yielded all positive responses from both the instructors and students. Students and teachers alike felt that podcasting improved their learning and teaching, respectively. The effect size reported for the latter statement was .25. Some of the open-ended questions clarified this result; "Podcasting makes lecture material available to students to clarify questions and reinforce important messages" (Lonn, & Teasley, 2009, p. 90).

This study shows that from both perspectives, podcasting is a useful tool, but other than perceptions and opinions, no evidence is presented on the mastery of knowledge. It is worth mentioning that both instructors and students perceive that it is extremely beneficial and an effective use of time as it allows for more flexibility in the classroom if additional material can be presented outside of the face-to-face time.

Podcast Usage and Learning Outcomes

Vogt, Schaffner, Ribar, and Chavez (2010) performed the next study at Otterbein College in the undergraduate, nursing program. They examined the students' learning and satisfaction with the addition of podcasts to the required child-health clinical course of their junior year. The same class was examined in 2007 and 2008. In 2007 the class was presented in the traditional lecture format, and in 2008 the content was presented with the use of podcasts. This comparative study between the 2007 class of 63 students and the 2008 class of 57 students was conducted by the use of a satisfaction survey and comparison of grades on the exams, which were the same over the two courses. There were no effect sizes reported; however there was no statistically significant difference between the two courses on the exam results.

There were, however, some differences, both positive and negative, when the individual exam questions were broken down by content showing a difference in comprehension of the material. Student satisfaction showed a positive experience with the use of podcasts for the class in 2008, with students finding it helpful when preparing for any quizzes or exams. This study is one of the only found that actually looked to examine the students' learning outcomes in addition to other factors, like student satisfaction. Since the exam results showed no statistically significance difference, it is difficult to determine whether or not it is useful to add podcasts to the classroom. It was only conducted over two years with a small sample size, making it difficult to draw any real conclusions. It is helpful to see that student satisfaction was positive, showing their willingness to utilize the additional resources made available to them. The ability to control for other variables by having the same faculty and exam makes it so comparison can be made, but expanding the sample size and adding more years to the study may show different results, allowing for differences in the quality of the students.

Student-Generated Podcasts and Student Learning

The use of podcasts from learner-generated formats was studied by Lee, McLoughlin, and Chan in 2008 as they incorporated "both undergraduate and postgraduate students from both IT as well as other disciplines, for a campus-based audience as well as for students studying off-campus in various locations around Australia and overseas" (p. 502). Weekly short podcasts were developed by the students and made available to their peers in a talk-radio-style performance. The students could bring in guest speakers that were experts on their topic or have informal dialogue among themselves on topics from their units of study. Many of the students that participated

were from a "first-level information technology unit on Internet technology and Web authoring" (Lee, McLoughlin, & Chan, 2008, p. 502). The sample size consisted of 247 students and the study was based on two focus groups held during the process. The first focus group occurred prior to the initial podcast creation, which also served as a template for the main session. This was followed by a second focus group that occurred just after the conclusion of the podcasts. Each team consisted of eight students, five of whom participated in the research and data collection. The students were from either an information technology program or a business and teaching program.

In order to examine the study effectively, the use of interviews and open-ended surveys allowed a mixed-methods approach. "Overall, the results show that students engaged in idea generation, collective problem solving and reciprocal dialogue, as well as in the exchange and revision of ideas" (Lee, McLoughlin, & Chan, 2008, p. 513). No effect size was reported, and the sample size was relatively small compared to other studies. This study's responses showed positive feedback to creating the podcasts in a group format. Students were able to share their learning experiences and create a useful tool for others to benefit from. There was no evaluation of the effect this project had on the students' grades or the students who accessed the podcasts. This information may have been helpful in determining if the podcasts were beneficial or just an interesting technology project. Since this study was performed with student volunteers, there is a strong possibility that the population could have already been familiar with or had some interest in podcasts, which could have affected the results. The groups were not created randomly, which allows for a certain amount of familiarity among the students, possibly

distorting the results of the survey. The results of the learner-generated podcasts exhibited a positive learning experience and satisfaction for the students involved.

Armstrong, Tucker, and Massad (2009) also conducted a study on learner-generated podcasts, which involved students from an introductory management information systems course in an undergraduate program with a sample size of 32 students. An evaluative questionnaire was given at the completion of the semester referring to the educational objectives that were presented to the students. The students were required to interview experts on a topic they chose and were given the choice of either creating a podcast or videocast. In addition to the questionnaire the students were asked to give feedback on their overall experience. There were no effect sizes reported, but all of the educational objectives were evaluated on a scale of one to five with five rating very high. Of the eight educational objectives, six received a modal response of five, and the other two had a modal response of four. The open-ended responses were all positive, as well as noting that the students wanted to partake in more projects that involved podcasting, and that it was a more creative approach as opposed to the more typical papers or Power Point presentations they are expected to do.

This study was strongly guided by Chickering and Gamson's *Seven Principles for Good Practice in Undergraduate Education* (1987), and according to the authors, they paid close attention to all seven principles to make sure they were incorporated in the educational objectives for this project. The learner-generated aspect of these podcasts played a pivotal role in allowing students to maintain an active role in their education, demonstrating how podcasts can serve as a catalyst to help students transcend from passive to active learners. Although there was no comparison of overall performance in

the course with the incorporation of podcasts, positive feedback was observed following the experience. Grade evaluation over a few semesters within this course may have shown a more accurate depiction of whether this project should be continued.

Lazzari (2009) conducted a study of learner-generated podcasts with two undergraduate courses, one a multimedia communication course and the second a human-computer interaction course. This study consisted of three progressive assignments. The first stage began with students familiarizing themselves with the editing capabilities of the podcast. The second stage consisted of the students generating their own answers to the specific interview questions, with which they could then update the initial interview. The last component of this project was for the students to select a topic, perform an interview to generate material for the podcast, and upload content for grading and peer review.

Comparing the overall grades from the course and comparing the current year with the previous two years' grades determined results. An effect size of .35 was reported, which shows a medium effect size; this may not be strong enough to determine that because of this project, the grade performances improved, but this certainly shows that further investigation is warranted. Perhaps adding more courses with the same project could either confirm or deny the results in comparison with previous years, which did not include the podcast project.

A summation of these studies presents a wide array of information upon which a research study can be conducted. Material and methodology within these investigations reveal a roadmap in which one can examine the effects of the use of podcasts in the classroom. When viewed separately the studies conducted all seem to be missing one or

more of the key components that can illustrate significant results that lead educators to believe that podcasting can serve as a useful tool. A majority of the studies reviewed student satisfaction with podcasts and the usage trends that are associated with it. These two variables must be understood before moving on to determining the learners' performance in the course following this treatment. However, it is a culmination of all three major components that will help determine whether or not podcasting produces a significant effect.

Methodological Issues with Existing Literature

There are several methodological issues that are apparent with the existing literature which coincide with some of the criteria for inclusion for the methods of this research. The first major areas include the sample sizes and the length of time in which the studies have been conducted over. Sample sizes were found to be small and restricted to a specific course within a major or a small program within a major. This impedes the ability to draw conclusion or determine significance within the study. Alternate classes in the technology or multimedia field that regularly access podcasts may have students who are well versed in the podcast technology, and may have an effect on the results because of previous experience. Since this researcher's focus is predominantly in the allied healthcare programs, it may be difficult to relate these particular studies. In order to determine significance to other educational programs, this may be challenging since the type of work is different from clinical to technology. Some stipulations included that not all students were required to use the podcasts. The studies that required students to develop and then use the podcasts showed a much higher rate of participation due to the fact that it was a mandatory component of the class. When something is mandatory a

forced outcome can occur as opposed to the participants choosing to utilize an additional resource.

In conjunction with the aforementioned issues, the results of some of the studies were either inconclusive or demonstrated a lack of significance and that could be in large part due to the small sample sizes. It is difficult to appreciate the statistical significance with a small sample size and often times with no report of the effect size. Most of the studies did not report the effect size. In fact, one specific review of literature by Hew in 2009, noted this exact issue with the studies that were included.

The overall design of the student-generated podcasts seemed clearly delineated with instructions, timelines, and technical support. However, the instructor-generated podcasts demonstrated diversity in the style, duration, and content that was included. There was a significant amount of discussion within these studies that suggested that podcasts should be used as a revision tool, which may just be a recording of in-class lectures, previews that students accessed in preparation for a class, or supplementary information to an in-class lecture. Due to the diversity in podcast formats, it is difficult to see the relevancy over a broad context when there is no common design.

When comparing discussions and limitations in both the instructor-generated and learner-generated podcasts, one can find a commonality; In the instructor-generated podcasts the results did not show a level of significance to facilitate the implementation of podcasting. Limitations include the lack of motivation of the students to use the podcasts on their own time especially when they were not required to do so. Studies revealed that students accessed podcasts primarily to review materials prior to an exam, clarify content, or if they had missed lecture for one reason or another. This made the

students more passive learners and little ownership was taken in this style. The learner-generated podcasts showed more promise in the future use of podcasts because it was a more interactive way for the students to learn as well as expand their knowledge of technology. Often times these podcasts were made available to their classmates and they found it helpful to see it from a student perspective, which could help in understanding that particular topic.

Surveys served as the most common measurement for the usage of podcasting as an educational tool. This research helped in determining the usage and accessibility of material for students when instructors created the podcasts. The survey examined when they were accessed, i.e. right before an exam, as they were made available, or if it was supplemental to an in-class lecture. They also evaluated when and how the students listened to the podcasts, i.e. during their regular study sessions, while performing some other activity like commuting or going to the gym. Research also suggests that the convenience and capability to download the podcasts to not only a PC, but also to an MP3 player so that they could be accessed anywhere. Contrary to what researchers believed, the majority of students listened to them on their PC and during their regular study sessions. One possible explanation for students' lackluster response to the survey may be their unwillingness to review the material if they felt as if it was redundant in nature. As is typical in most surveys, students generally will lack motivation to take part in a survey when they feel that they are wasting their time, or a grade is not being assigned. Another portion of students who did not access the podcast for their class felt that it was unnecessary to complete a survey. This will potentially affect the results of surveys and any assumptions based on the findings.

Several studies that surrounded the student-generated podcast were part of an assignment or project for the course. These particular studies required students to familiarize themselves with the technology. Once the students integrated the use of the technology into their daily activities, a better understanding of the effectiveness of the usage of podcasts as an educational tool from the students' perspective could be determined. One particular methodological pitfall would be over analysis of the students' perception of the applied variable and not enough investigation on the effects of the learning outcome. A combination of grade comparison between courses, surveys regarding their experience in creating the podcasts, and knowledge base prior to activity seems the most logical approach for research.

Effects of the Implementation at Institutions

Keeping pace with innovation, technology has created a plethora of educational tools that have the potential to increase student learning, which in turn makes that particular program or institution more marketable to future students. Several universities within the United States that have implemented the use of podcasts in a campus-wide program to determine the interest of the students, as well as any influence on their learning outcome. Duke University, Princeton University, Stanford University, and University of California – Berkeley have all embarked on projects to determine if podcasts will aid in their students' learning (Armstrong, Tucker, & Massad, 2009). Duke University (2006) distributed iPods to all 1,600 first-year students in 2004 to encourage the use of technology in new ways. The university wanted to determine if podcasts were effective in promoting technological initiatives that they were trying to establish.

The iPods were used in four different capacities, and then results were gathered through feedback surveys from faculty and students as well as campus administrators and other stakeholders. The four areas the survey focused on were the course content dissemination tool, classroom recording tool, field recording tool, and study support tool. These four major survey focus areas are the most frequently examined in conjunction with much of the other literature that has been reviewed. The results of Duke University's project led to the official Duke Digital Initiative, based on the positive preliminary comments from both instructors and students. In 2004 at Duke, 20GB Apple iPods were distributed to the 1,600 entering first-year students (Duke University, 2006). "At least 15 fall courses with a total enrollment of over 600 students incorporated iPod use" (Duke University, 2006). Students found it very helpful in simply being able to record the lectures and play back at their convenience. They could review a difficult topic, take notes at their pace, and review for exams while doing other tasks. In courses that had listening comprehension components, for example language or music, students found it helpful to be able to play back what was presented in class to review at a later date.

This study had one of the largest sample sizes with 60% of the approximately 1,600 first-year students participating during of both the fall and spring semesters. Lastly, as a study support tool, the iPod was extremely helpful in returning to lectures or other orally presented material that if they did not have access, would have no other avenue to use. The success that Duke University encountered, led to Princeton University, Stanford University, and University of California – Berkeley to introducing it to their respective campuses, all with the goal to study the influence that the use of iPods on campus.

Some instructors found it easier to incorporate the use of the iPod into their curriculum, notably those teaching foreign language and music courses as well as engineering classes. There were some technical limitations that did not allow for all types of information to be easily transferred to a podcast format. Some concerns were the effect it would have on classroom attendance if students knew that lectures or other information would be posted. However, those concerns were dispelled by attendance records and can be concurred by separate studies at other institutions that found similar results. When given the choice, most students preferred the face-to-face communication and using podcasts as a supplement. This particular study had a large sample size, removed technical issues by giving out MP3 players as well as by offering PC access to manage when needed, and all course types were involved. Obviously there is a financial component that not all institutions would be able to replicate, but with the ever-increasing availability and affordability of this technology, it may not be necessary to have the financial means to this extent.

Institution-wide implementation of the use of podcasts certainly eliminates a number of the limitations that some of the studies have mentioned regardless of why schools are performing the research. Some of these limitations include the lack of resources for students and instructors, technical challenges for students and instructors, and not enough support by the institution. By distributing the technology to all participants, no group would be left out of the additional resources of acquiring knowledge. The culture of institutions regards the traditional lecture format as the best teaching method, and this will never change unless the culture of the institution makes the transition. Incorporating the use of technology in the classroom is the current trend

that is attempting to take the focus off of the lecture. The use of podcasts can be one way to improve on the lecture, the purpose of which is to transfer knowledge and initiate investigation for the students. If the use of technology and in particular the use of podcasts becomes commonplace on a campus, then could be very positive effects on students' learning.

Effects on Learning Outcomes at the Classroom Level

The final area that has been examined and that will be discussed in this review is the determination of effects, if any, that podcasts have on the learners. There were studies that looked at the effect on the students' grades with the use of podcasts mainly as supplemental or substitutional information. At Otterbein College in 2007, a nursing class of 63 students was compared to a class with the same course content in 2008 with 57 students. The 2007 class was presented in the traditional lecture style, and the 2008 class was presented with the same content using the podcast format. Using the same faculty and exam to compare scores between the two years of students, an evaluation was performed (Vogt, Schaffner, Ribar, & Chavez, 2010). This particular study showed no statistically significant difference in learning acquisition between the two classes. Student satisfaction was also measured, which did show significant improvement between the two classes, but limitations were discussed as to why learning acquisition was not improved.

When examining the effects of podcasts on student learning based on the existing literature, there needs to be separation between the two major types of studies that have been reviewed. First, there are studies on the use of podcasts by instructors and there are studies on the use by students.

The usage of podcasts during a course as well as the type of material that was put into the podcasts often entailed prior to some type of assessment and as a review module for material that was important. Lonn and Teasley's study that was performed in 2009 at a large American Midwestern university reported the effect size for their study. This study examined the use of podcasting focusing on the type of material that was put into the podcasts and how the students accessed them. The students found the podcasts to be helpful especially prior to quizzes or exams. The students used the podcasts to review the material that had be covered as opposed to not attending class at all, which was a concern of professors with the incorporation of podcasts into their courses. The students did not believe that the podcasts enhanced the instructors' teaching capabilities, but the effect on student learning was positively effective although not statistically significant. This particular effect size of .25, was small according to educational standards (Lonn, & Teasley, 2009).

Another study that was examined the use of podcasts by students at the University of Bergamo in 2005-2006. The students created the podcasts for a multimedia course, and the podcasts were then made available to their classmates. Grades were compared over three years from the same course, but the most recent year added the use of podcasts as an educational component to the course. There was a statistical significance in the improvement of grades due to the new educational method applied to the most recent school year of 2005-2006 for full time students. The part time students did show improvement, but it was not statistically significant. The authors noted that comparing the part time students to the full time should also be cautioned because full time tend to perform better in general than part time without any experimental intervention. Also

important to note was that the student satisfaction showed statistical significance in the new educational method of presenting the material. This effect size was considered significant in educational standards, with the results being .35 (Lazzari, 2009). For both of these particular effect sizes, it can be said that they are technically significant if they are being evaluated on the scale of 0.20 is a small effect, 0.50 is a medium effect, and 0.80 is a large effect (Witte & Witte, 2007).

Conclusion

A common thread found along much of the gathered research demonstrates that there is an overall limited understanding of the effect of podcasts on students' learning outcomes. Although information has been gathered from both students' and educators' perspectives about the use of podcasts, minimal investigation has been conducted on students' learning outcomes to determine podcast effectiveness. Previous literature suggests that there is no longer a concern whether or not technology is welcomed in the classroom, and given the current state of technological advancement and computer literacy among students, a more thorough evaluation of effects on learning outcomes is necessary. Among the limited number of studies on students' performance and the learning outcomes, a majority of the studies utilized instructor-generated podcasts. As in the literature review, a stronger research approach would involve the learner-generated podcasts due to the requirement that students develop into active, rather than passive, learners. This approach allows researchers to truly evaluate the learning outcome of students as active learners.

The literature that has been reviewed shows that the use of videocasts in the classroom is on the rise. Instructors, students and the institutions are finding ways to

integrate it into the classroom either as a supplement to traditional instructional strategies or as new ways to bring more into the classroom virtually. Most of the studies examined in this review show positive attitudes towards the incorporation of videocasts, but there is certainly a limited amount that has addressed whether or not it has a positive impact on learning outcomes. In order to further support the use of videocasts in the classroom, the next logical component would be to examine the effects on learning outcomes. Examining this topic from the perspectives of the students, but also the instructors as well as the peers would make it a more thorough investigation to either prove or disprove the hypothesis. Theoretically, educators and researchers have been guided by the way students learn and how to best implement the use of the technology as to not overshadow the content or pedagogy that is being delivered.

Chapter III

METHODOLOGY

The purpose of this study was to evaluate the effect of the use of videocast on student learning in a medical science discipline by comparing it with the use of the traditional presentation approach. More specifically, this study examined whether learning outcomes measured by evaluations which generated scores would differ by student presentation format: traditional vs. videocast. The hypothesis of this study is that there will be a statistically significant difference in student learning outcomes with a videocast-presentation format versus a traditional format, which will indicate whether students will be able to better master the information using the technology. The extra time and preparation in recording the videocast and familiarization with the material to present demanded the presenter to be comfortable with the information. This was necessary to answer questions and engage the students' peers in learning the information and therefore furthering their understanding of the information. Preparation of the taped demonstrations also fostered critical thinking skills about how best to present the information so that if a student were to watch the videocast later on, it would be clear and concise with the pertinent information.

The research question was: do evaluation scores for each of the three surveys for the videocast and traditional presentations differ significantly in a statistical sense among student peer evaluations? Do the two sets of scores differ significantly in a statistical sense among instructor evaluations? Do the two sets of scores differ significantly in a statistical sense among presenter self-evaluations?

The first null hypothesis was that undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the instructor evaluations. The second null hypothesis was that undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the student peer evaluations. The third null hypothesis was that undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the self-evaluations.

Design

This study utilized an experimental design to answer the research questions. Experimental studies aim to investigate whether there is any treatment effect on participants' behaviors or their internal processes (Lee, 2012). The intervention is the videocasts and the dependent variable is the specific outcome scores for the evaluations.

Ideally with educational research there would be a control group and an experimental group. Then, one of three ways of research can occur, the experimental group receiving the intervention, the amount of intervention can be adjusted or a different type of instruction technique can occur. If two groups can be studied then randomizing the trials would allow for what is considered the gold standard in measuring the intervention to determine its level of effectiveness. A randomized controlled trial is not always available, which is the case of this study, which is why a repeated measures design is being used. All of the participants in this study received all of the treatments and they serve as their own controls.

Repeated measure research designs help to control for individual differences

because each subject is measured more than once. "By focusing on the differences

between pairs of scores for each subject, the investigator effectively eliminates, by the

simple act of subtraction, each individual's unique impact on both endurance scores"

(Witte & Witte, 2007, p. 311). When examining two related samples the observation with

and without the dependent variable to determine if there is a statistical significance.

Additionally, the subjects can be paired based on other variables that are a match to aid

with some concerns over testing the same subject twice. This can help to control for any

lasting effects of the treatment or for some other uncontrolled variable that has a

significant impact on the results. "Counterbalancing aids in eliminating a potential bias in

favor of one condition merely because subjects happen to experience it first or second"

(Witte & Witte, 2007, p. 313). Simply reversing the order in which the two treatments are

received when the subjects are broken up into two groups, with one group receiving the

treatment first while the other group receives it second.

There are three t tests for population means which include one sample, two

independent samples (no pairing), and two related samples. If there is just one sample the

t test can be utilized to determine if there is statistically significant difference when

comparing the sample with and without the intervention. Two samples need to be

determined if there will be pairing or not. If there is pairing with either a repeated

measure or matched pairs of different subjects then the appropriate t is the related

samples. If they are not paired at all then the appropriate method is independent two-

sample t test (Witte & Witte, 2007). When looking at two related samples it is important

to use the dependent two-sample t tests. Some examples of two dependent samples are

siblings, spouses, one sample being compared with themselves, and samples that are not related.

There are three possible statistical hypotheses with the *t* test which are nondirectional, directional with lower tail critical, and directional with upper tail critical. The nondirectional entails no effect or a negative effect on the variable. If it is greater than zero then it is directional with upper tail critical and if it is lower than zero then it is directional with the lower tail critical. If the *t* test is statistically significant the Cohen's *d* to make an estimate of the effect size. "According to Cohen's guidelines, mentioned previously, estimated effect size is small, medium, or large depending on whether *d* is .20 or less, .50 or .80 more, respectively" (Witte & Witte, 2007, p. 320). Therefore based on the descriptions of the *t* tests, the dependent two-sample *t* test, non-directional will be used. This is the most appropriate approach for the study conducted because comparison of the same group at two different times will be taking place.

It is important to note that the cause and effect of results from the use of videocasting can best been seen from an experimental design approach. This is a more thorough approach than simply reporting descriptive statistics to show the relationship the intervention may have had on the independent variable. A quantitative approach will be used to answer the hypothesis and research questions of this study. Comparison of the means is appropriate when looking at two related samples with an intervention. One of the general linear models, the paired (or two-dependent sample) *t*-test is appropriate in this study.

There are three critical assumptions that need to be met for the results of the paired *t* tests to be valid. The first is an assumption of normalcy. With the paired *t*-test

since the samples are correlated then assuming they are from normally distributed populations with equal variances it is unnecessary to test for assumption. The next assumption is the equality of variance, which again the case of a paired t test should be accounted for because the same subjects are being used for comparison resulting in no variance within the groups. The last assumption is of power. Statistical power is generated from the sample size, level of significance and effect size. As mentioned previously risk of a Type 1 or Type 2 error can be accounted for with an appropriate sample size at a p value of .05 or less. Additionally Cohen's d will assist with this assumption. This helps to control for when the sample sizes are non-normal and have unequal variances. Since this study is operationalized as experiments, no regression analyses are actually required. Additionally, the survey produces ordinal data, asking the raters to rank the presenters, therefore making it non-parametric data. By analyzing the differences in evaluation scores between the two different presentation formats regarding presentation skill level and audience perception of presenter knowledge, it can be determined if using videocasts enhanced the learning experience in either course.

Sample

The sample that was evaluated for this study included students enrolled in three separate courses in two CAATE-accredited athletic training programs, two at a professional undergraduate level and one at a graduate level. The undergraduate institution is a state institution with approximately 40 students in the athletic training program. This university has been accredited since 1997, and currently accredited by CAATE since they took over in 2000. The graduate institution is a private institution with approximately 30 students in the athletic training program. This university has been

accredited since 2003 by CAATE. Both institutions' are entry-level professional

education programs that prepare students for the national certification exam upon

culmination of their program through the Board of Certification. These institutions have

been chosen due to the diversity of the student population, level of education, and a

sample of convenience.

The courses that were chosen for data collection are two different content areas,

the first Therapeutic Exercise, and the second, Therapeutic Modalities. The formats for

the presentations are the same; however, they are slightly different criteria for each

course. Therefore, there are separate methodologies for each course that are described.

Any prior knowledge in athletic training of the students would be minimal from

any observations or personal experiences they had prior to entering the program. Age and

maturity level would not necessarily impact the ability to present their topics because all

students are learning the material for the first time. Sampling from both the

undergraduate and graduate professional programs allows for representation from all

classes that would potentially look to implement the use of videocasts.

Therapeutic Exercise Course:

Each student was responsible for carrying out two separate presentations.

Students were randomly assigned one injury from each of the two following areas:

hip/low back and one from the upper extremity. The presentation randomization method

utilized had the students picking the topic from a box. To randomize the presentation

format, each student picked a card that was either A (videocast) or B (traditional) for their

first presentation. Each student designed a therapeutic exercise protocol specific to that

injury, and then provided progressions through the healing process. Each presentation

format was approximately 5 minutes in length, using a variety of therapeutic exercise techniques. Presenting via videocast, the students recorded their model demonstrating the exercises while narrating verbally. Digital flip-cameras were available to the students during each of the class meetings to record their protocols. This video file was submitted to the professor, who uploaded it. The student, via videocast, then presented it. Each student provided a verbal narrative to accompany the videocast. At a different point during the semester the same student presented a second time via traditional method, the students verbally explained the specific injury protocol while using a model to provide the demonstration live in class. Some students elected to include the use of power point for another visual component.

Regardless of presentation method, the class was responsible for critiquing the protocol or procedure and providing feedback regarding additional clinical techniques by completing the evaluation survey. The class instructors helped to facilitate discussion by, a) interjecting their own clinical experiences, and b) encouraging students to share what they have experienced during their clinical rotations.

Therapeutic Modalities Course:

Each student was responsible for two separate presentations. Students were randomly assigned one therapeutic modality. In a five-minute presentation, the student included a brief description of the modality and the basic operating instructions. An explanation of the physiological effects that the modality induces was also included. A discussion of the indications and contraindications was thoroughly reviewed as well as any precautions that could cause harm to the patient or clinician. Presenting via videocast, a specific step-by-step application and setup procedure was explained. This

overview included the sensations the patient would experience, preparation of the area that will be treated, and position of the patient for a comfortable treatment. The specific application parameters were addressed, including the setup of the modality, treatment parameters, patient's response to the treatment, and frequency and duration of the therapy. Upon conclusion of the application, identification of post-treatment recommendations, instructions, and safety precautions was discussed. Digital flip-cameras were available to the students during each of the class meetings to record their protocols. This video file was submitted to the professor, who uploaded it. The student, via videocast, then presented it. Each student provided a verbal narrative to accompany the videocast. At a different point during the semester the same student presented a second time via traditional method, the students verbally explained the case study and literature review on the assigned therapeutic modality. Some students elected to include the use of power point for another visual component.

Instrumentation

Addressing both internal and external validity with any study is important in order to optimize the likelihood of a quality study that will produce useful findings. Internal validity as Lee (2012) describes helps to control for variable to comprise the integrity of the study and the link between the independent and dependent variables. These can range from the history of the participants with the information they are learning to the mortality of the participants who may not remain in the study. Also, the maturation of the participants as well as the selection, familiarity of the testing, the treatment being discussed between participants, and the diversity of the participants' prior abilities. Randomly assigning participants can help control for these variables, but educational

research makes it very difficult to control for all of them. Interpreting the results as well as applying based on the outcome of the study should be done with caution, as it is not easy to control for all variables. External validity addresses the generalizability of the study to the learner groups and the sensitivity of the participants knowing that they are a part of a study according to Lee (2012). Repeating the study more than once can aid in the first threat, but this is not always a viable option. Stringently controlling the experiment to handle participants trying harder because they are aware of the conditions can be attempted, but again takes much more effort than may not be available. One way that to help control for these two threats is to conduct a natural experiment, which this study has done. "In the context of classroom research, a natural experiment may be conducted when one can get access to participants who have already experienced a particular treatment of interest (rather than providing such a treatment after a sampling procedure), and give a test measuring the dependent variable on which they aim to estimate the effect of a treatment" (Lee, 2012, p. 36). This can contradict controlling for internal validity, but trying to control for both internal and external validity is very hard with educational research.

The validity of the evaluation instrument that was used in this study was content validated by a panel of Athletic Training faculty. This panel included two faculty members from the athletic training program at the graduate institution and one faculty member from the undergraduate institution. The instrument utilized was taken from an unpublished source. The students randomly selected the assignment of presentation topics as well as which topic is presented via videocast and which topic is presented through

traditional format. The topics were put into a box for each student chose two topics as well as separate cards to determine which format of presentation was performed first.

Utilizing the same format of data collection among each sample will ensure the reliability of this study. Instructions, evaluations, presentation environment, equipment usage, and data analysis will be consistent throughout this study in order to ensure this study can be replicated. The three classes were combined as the final sample because the focus is not on the level of education, but on the implication on student's mastery of knowledge. The differences between the classes, age, maturity level, number of years of higher education, and the course assignment do not impact the results because both of the programs are entry level.

The data collected in this study were surveys evaluations on both the videocast and traditional presentation performed by each student. Three evaluations of each presentation were conducted: 1) course instructor evaluation, 2) peer evaluation, and 3) self- evaluation. The assessment of the effectiveness of the videocast presentation consisted of three different evaluation instruments depending on the role of the evaluator. The evaluation instruments measured the overall quality of the presentation as well as the demonstration of knowledge and skill specific to the student's assigned topic utilizing a Likert scale (0-4 possible points). A score of zero indicate the least affirmative response with each number increasing to the maximum score of four which is the most agreement with the statement or question on the survey. Specifically, questions on the evaluations include examining the presenter's preparation, knowledge of subject matter, ability to demonstrate the skill, questions to their peers to promote critical thinking, and bringing additional information relevant to the topic. The results were summarized using

descriptive statistics including means and standard deviations. Score Comparison was accomplished via a within subjects dependent two-sample t test. Significance was set prior at an alpha of ≤ 0.05. All statistical analyses were performed using SPSS Student Version 22 manufactured by IBM.

The outcome variables for this study are the scores based on the two separate presentation formats on each survey. The instructor and self-surveys elicited one score per student presenter as there was only one evaluator not requiring to create a composite score as in the case with the student peer evaluations. The student peer evaluations gave scores to the same presenter, but with multiple evaluators. To account for this, mean scores were calculated to therefore result in a score for each presentation format to do the comparison for each student presenter. The data is considered continuous data, ranging from zero to the four possible points on the survey.

Table 1 – Undergraduate Professional Program Evaluation Tool

Instructor/Peer	Self
Was the information presented relevant?	Was the information presented relevant?
Was the content appropriate to the audience?	Was the content appropriate to the audience?
Was the topic presented clearly?	Was the topic presented clearly?
Did the presenter speak clearly?	Did you speak clearly?
Did the speaker project appropriately so that all could hear the presentation?	Did you project appropriately so that all could hear the presentation?
Did the speaker ask appropriate questions of the audience?	Did you ask appropriate questions of the audience?
Did the speaker answer questions appropriately from the audience?	Did you answer questions appropriately from the audience?
Were questions answered satisfactorily?	Were questions answered satisfactorily?
Was the speaker prepared for the presentation?	Were you prepared for the presentation?
Was the presenter comfortable with the subject matter?	Were you comfortable with the subject matter?
Did you learn anything new from this presentation?	Did you learn anything new from this presentation?
Did the speaker present the specific modality?	Did you present the specific modality
Did the speaker present goals for the therapeutic modality?	Did you present goals for the therapeutic modality?
Were the goals presented appropriate to the modality?	Were the goals presented appropriate to the modality?
Did the speaker present modality appropriate to the goals presented?	Did you present modality appropriate to the goals presented?
	Did you enjoy the format of the presentation?
	List several pros of the format
	List several cons of the format

Table 2 – Graduate Professional Program Evaluation Tool

Instructor/Peer	Self
Was the information presented relevant?	Was the information presented relevant?
Was the content appropriate to the audience?	Was the content appropriate to the audience?
Was the topic presented clearly?	Was the topic presented clearly?
Did the presenter speak clearly?	Did you speak clearly?
Did the speaker project appropriately so that all could hear the presentation?	Did you project appropriately so that all could hear the presentation?
Did the speaker ask appropriate questions of the audience?	Did you ask appropriate questions of the audience?
Did the speaker answer questions appropriately from the audience?	Did you answer questions appropriately from the audience?
Were questions answered satisfactorily?	Were questions answered satisfactorily?
Was the speaker prepared for the presentation?	Were you prepared for the presentation?
Was the presenter comfortable with the subject matter?	Were you comfortable with the subject matter?
Did you learn anything new from this presentation?	Did you learn anything new from this presentation?
Did the speaker present the specific injury?	Did you present the specific injury?
Did the speaker present goals for the therapeutic exercise program?	Did you present goals for the therapeutic exercise program?
Were the goals presented appropriate to the injury?	Were the goals presented appropriate to the injury?
Did the speaker present exercises appropriate to the goals presented?	Did you present exercises appropriate to the goals presented?
	Did you enjoy the format of the presentation?
	List several pros of the format.
	List several cons of the format.

Limitations

The level of impact that technology has on students' performance has been examined in many different avenues, but it is not always or easily tested based on actual performance. This study examined the effect, if any, on the total scores of the surveys from the three different evaluators when comparing the presentations in two different formats – the traditional power point versus the videocast.

The first limitation of this study was the small sample size. Athletic training programs have on average 10-15 students at each level. Attempting to collect enough data to make a statistically strong study would require collecting from many different classes

which could lead to more error on procedures that could affect the outcome. Although this study strived to collect data from three different classes, future researchers may consider larger sample sizes to replicate this study.

The second limitation was that this was not a qualitative study, or better yet a mixed method study that could include more on the students' experience that may help to understand or elaborate on the findings. The third limitation was that the scores used for comparison had to be generated by calculating a mean due to the fact that there were multiple evaluators for the student peer evaluations and brought up a question on inter-rater reliability. And lastly, some cases had to be removed due to the fact that they were not complete by more than 90%. This led to different amounts of evaluations that the individual presents received.

Of course having a larger sample size would be able to strengthen the power of the results, but it may not necessarily mean the results will not be applicable. Having qualitative data may add to the study, but it may not add to what the research questions are looking at, was there an impact on the learning experience of the students. Calculating mean scores to accommodate for the multiple evaluators on the student peer evaluations may have an impact, but this was the best solution this researcher could determine. The incomplete surveys needed to not be included as they would have impacted the scores and in turn impacted the results of the data. It is the opinion of this researcher that even with these limitations, the results will be conclusive to make a determination if there was an impact on the scores between the two types of presentation formats.

Chapter IV

RESULTS

The scores for the student presenters for the instructor surveys do not suggest that the two presentation formats vary significantly based on the statistics. The surveys completed by the student peers do suggest that the two presentations vary from each with statistically significant data showing that the traditional format scores were significantly higher than the videocast format scores. The surveys completed by the presenters themselves indicate that the two presentations did not differ significantly.

The sample was collected from both institutions. The presentations were a component of the course work required. Therefore, participation was mandatory. Any missing cases of data reported were due to absenteeism, lack of time for any of the participants to complete the evaluations, participants not completing the survey in its entirety or students not completing the course within the semester. This was accounted for by removing any cases that had less than 90% of the survey completed. There were a total of 55 instructor surveys for both the traditional and videocast presentations. There were a total of 50 student peer surveys for both the traditional and podcast presentations, five cases were removed due to less than 90% of the survey being complete. There were a total of 54 self-surveys for both the traditional and podcast presentations, one case was removed due to less than 90% of the survey being complete.

Basic Descriptive Statistics

Of the 55 students who were solicited for participation in this study, missing data was excluded on a case-by-case basis removing surveys that have less than 90% of it

completed. There were no personal identifying markers for the students involved.

Descriptive data tables of final participation are exhibited below.

Table 3 – Descriptive Statistics for the Three Paired t-tests

Evaluation Type	Presentation Format	N	Mean	Std. Deviation	Std. Error Mean
Instructor	Traditional	55	49.65	8.033	1.020
	Videocast	55	49.16	9.966	1.266
Peer	Traditional	50	54.34	6.721	0.950
	Videocast	50	53.560	7.1032	1.0045
Self	Traditional	54	45.00	3.841	0.523
	Videocast	54	47.17	3.549	0.483

Table 3 reports the number of surveys that were completed. As mentioned previously,

total potential cases was 55, cases with less than 90% of the survey complete were

eliminated resulting in an n that varied from potential maximum. Minimum possible

score on each survey is a 0 and maximum possible score is 60. The higher the score the

each student received, the more positive evaluation of the presentation format.

Table 4 contains the paired sample correlations and the paired sample t tests statistics

separated by the three separate evaluation surveys – instructor, peer, and self.

Table 4 – Comparison Between Traditional and Podcast Presentation Scores Based on
Instructor's Evaluation

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Instructor Trad - Videocast	0.484	9.170	1.165	-1.845	2.813	0.415	61	0.679
Peer Trad-Videocast	-2.167	4.364	0.594	-3.358	-0.975	-3.648	53	0.001*
Self Trad-Videocast	0.7800	8.6997	1.2303	-1.6924	3.2524	0.634	49	0.529

The student presenters had a mean score of 49.65 on the instructor evaluation for
the traditional presentation and 49.16 for the podcast presentation. The mean difference
was .484, with a standard deviation of 9.170. There was not a significant effect for
videocast presentation formats, $t (0.42) = 61$, $p <.005$, with the null hypothesis cannot be
rejected; i.e., that scores on the two presentation styles were not statistically different,
based on the instructor's evaluation.

The student presenters had a mean score of 45.00 on the peer evaluation for the
traditional presentation and 47.17 for the podcast presentation. The mean difference was -
.2.167, with a standard deviation of 4.364. There was a significant effect for traditional
presentation formats, $t (-3.65) = 53$, $p <.005$, with the null hypothesis that should be
rejected; i.e., that scores on the two presentation styles were significantly different.

Specifically, the peer evaluation scores for traditional presentations were significantly higher than those for videocast presentations.

The student presenters had a mean score of 54.34 on the self-evaluation for the traditional presentation and 53.560 for the podcast presentation. The mean difference was .7800, with a standard deviation of 8.6997. There was not a significant effect for videocast presentation formats, t (0.63) = 49, p <0.005, with the null hypothesis cannot be rejected; i.e., that scores on the two presentation styles were not significantly different.

Summary of Findings

The data presented above gives empirical evidence to explore whether there are differences in the evaluations scores in student learning outcomes with the videocast presentations format versus the traditional format, which may indicate more successful mastery of the information using the technology. The tables presented the descriptive statistics as well as the results of the paired t tests to determine the outcome of the study. The results yielded the peer surveys showing statistical significance in favor of the traditional format versus the videocast format. Neither the instructor survey nor the self surveys showed statistical significance. As previously described in the limitations section in Chapter three some reasons can be due to small sample size, the need to calculate mean scores for the student peer evaluations and that some of the cases needed to be removed due to lack of completion.

Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Technology in the classroom has evolved drastically over the past two centuries. Starting with the chalkboard in 1890, to the pencil in 1900, the overhead projector in 1930, the ball point pen in 1940, the hand held calculator in 1970, the Plato computer in 1980, the interactive white board in 1999 to the present state where many institutions of learning give students their own personal computer. According to the National Center for Education Statistics (NCES), about 35 percent of American public schools had Internet access in 1994. By 2002, that percentage increased to 99 percent (NCES, 2005). Despite the increasing amount of technology in the classroom, it is still not always conclusive which forms have a positive impact on students' learning experience. Some of the simpler forms of technology advances are easier to see, ie. the chalkboard, pencil and pen, but more advanced technologies are not as clear.

In conjunction with many of the technological advancements come changes to instructional strategies. Traditionally the lecture style dominated the classroom not taking into account the many learning styles of the students. Attempting to involve more student involvement by utilizing more hands-on projects and teamwork has been one of the more popular ways that technology has been incorporated. The use of podcasting from both the instructor and student approach has been utilized since the early 1990's with the use of the MP3 player for another avenue to present and disseminate information.

Transitioning the students from the passive learner to the active learner and taking some of the responsibility of their learning off of the teacher and putting it on them to make it more meaningful. Encouraging the students to develop their critical thinking

skills to better understand and process the content that is presented to them will foster a more successful mastery of knowledge and future application. In 2004, Ehrmann noted the need to utilize technology to promote student engagement in conjunction with the content presented by the instructor as opposed to fully relying in the technology itself to do the teaching.

The use of videocasts as an instructional tool in medical health sciences courses that had a large amount of didactic skills that could not be reviewed beyond the classroom was the focus of this study. The study compared the scores of the student presenters in two different formats of presentation styles, traditional vs. videocast. The scores were generated from surveys completed by the instructors, student peers, and the student presenters.

Overview of the Study

This study assumed the need for new instructional techniques to assist with the didactic components of courses within the medical health science programs to allow students the capabilities to review outside of the classroom. This study also assumed that the students would benefit from the additional preparation of a presentation to teach their classmates in order to fully comprehend and have the ability to apply in real world scenarios. The study compared the mean scores of the student presenters from the surveys completed by the instructors, student peers and student presenters for both the traditional format presentation and the videocast presentation.

The goal of this study was to add to the field of research exploring new instructional techniques for courses with a significant amount of hands on skills in the medical health science programs. This study in particular looked to extend on the

recommendation of Armstrong, Tucker, and Massad 2009, as well as Lonn and Teasely 2009. Both studies examined the perception of the students and the instructors on the integration of podcasts in the courses, but neither found conclusive evidence on its impression of student learning.

Research Design

This study was a cross-sectional analysis of data collected through the completion of surveys evaluating student presenters. Valid data was collected on 55 undergraduate and graduate students in CAATE accredited, professional Athletic Training Programs. The presentations were part of the course syllabus which made them required if the students did not want to receive a failing grade for not completing the assignment. Completing the surveys was also required, wherein this was considered part of the students' participation grade for the semester, not specifically for completing the surveys. Each student performed two different presentation styles throughout the semester one being a traditional style and the other a videocast.

Individual Hypotheses

The following are the null hypotheses that were tested:

1. Undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the instructor evaluations.

2. Undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the student peer evaluations.

3. Undergraduate and graduate athletic training students will perform the same, on average, on two presentations, independent of the format (traditional or videocast) among the self evaluations.

Summary of Findings

Hypothesis 1

Hypothesis 1 looked at the mean scores of the two student-presentation formats evaluated by the instructors. The null hypothesis cannot be rejected as the scores of the two presentations were not significantly different statistically. According to the data of this study, students did not perform significantly different between the two presentation formats. In McKinney and Page's study in 2008, they examined nursing students' views on inclusion of a variety of multimedia resources. This was a mixed method approach, which showed that 89% felt that the podcasts enhanced their learning experience and additional positive comments confirmed these results. Students felt that it was helpful to go back and review for tests or material missed as well as review as needed for challenging topics. It did not yield any specific learning outcome results as this was one of the studies that led the research in this direction to examine if there were any effects on learning outcomes. The small sample size may account for the reason for lack of statistical significance.

Additionally Vogt, Schaffner, Ribar, and Chavez's study at Otterbein College in 2010 examined an undergraduate nursing program and the effects of podcasts on the students' learning and satisfaction. This study did actually attempt to examine the learning outcome as well as attitude toward the podcast integration. There was no statistically significant difference when the two semesters' grades were compared,

potentially due to a small sample size, however the perception of the students was positive and they felt it did enhance their learning experience. It is important to note some previous studies to further connect the necessity for the methodology in this study to examine the learning outcomes. It seems there is mostly positive feedback with the use and incorporation of the technology, however there has been minimal proof of its effectiveness.

Hypothesis 2

Hypothesis 2 looked at the mean scores of the two student-presentation formats evaluated by the student peers. The null hypothesis should be rejected as the scores of the two presentations were significantly different statistically. The data from the student peer evaluations shows that statistically the presenter performed better for the podcast presentation as compared to the traditional format. The study in 2008 by Lee, McLoughlin, and Chan examining a first level information technology unit on Internet technology and Wed authoring resulted in positive feedback from the students that allowed for a more interactive course format with the students working collaboratively, engaging their critical thinking skills and preparation for educating their classmates on their assigned topic. They did note that no examination of the learning outcome was performed and could have been helpful in determining its level of impact. Noting the limitation of the previously completed studies assists in confirming the focus of this study.

Hypothesis 3

Hypothesis 3 looked at the mean scores of the two student-presentation formats evaluated by the student presenters. The null hypothesis cannot be rejected as the scores

of the two presentations were not significantly different statistically. The data does not present any statistical difference between the two presentation formats on the self surveys. Armstrong, Tucker, and Massad examined the use of student-generated podcasts in 2009 in an introductory management information systems course with a sample size smaller than this study, 32 versus 55, showing that six of the eight educational objectives received a modal response of four on a scale of one to five with five being the highest. Additionally open ended responses were collected which yielded positive responses to the inclusion of student generated podcasts. Chickering and Gamson's *Seven Principles for Good Practice in Undergraduate Education* (1987) guided this study as well as the 2009 study including the principles that encouraged the passive learner transitioning to the active learner. Again, no overall comparison of the course performance was examined, but students found the experience to be very positive. The lack of study on the learning outcome is one of the reasons for the format of this study.

Discussion and Implications for Practice

The endless amounts of technology advances that have developed over the time in relation to instructional techniques as well as the needs of the learners can make it very difficult for instructors to determine the usefulness for implications on learning outcomes. The literature review conducted for this study uncovered many studies that polled the perception of the students and the instructors about the incorporation of podcasts, but very few actually examined the impact on the students' academic performance. This study looked to remedy this common thread by attempting to show statistical significant difference on the performances of the two presentation formats – traditional and podcasts.

Two of the three surveys did not show statistical significance. If this study were replicated this could be rectified by increasing the sample size, as well as including some qualitative data. The one survey that did show statistical significance was the student peer evaluation, which is interesting considering that the audience that this was partially targeted for found their peers to have performed better on the podcast presentation, but when evaluating themselves according to this data there was no difference. Adjustments to certain components of the methods may make more statistically significant data to be generated, perhaps changes to the survey questions and ensuring that all surveys were completed fully to not have the need for removing cases.

Interestingly enough, although statistically there were was no significance, the mean scores on the self evaluations showed that the traditional presentation was higher than the podcast presentation. The instructor evaluation mean scores were much closer with the mean scores only varying by five tenths of a point. The perceptions of the student presenters and the instructors seem to show differences in which of the presentations was more effective and was graded higher.

Recommendations for Policy and Further Research

The recommendations resulting from this study are presented in two sections. The first section will demonstrate policy recommendations concluded from this study, in relation to the literature review. The next section will provide recommendations for future research, presented to potentially improve upon and expand on the methodology and data analysis approach to yield more conclusive or new results to guide the use of podcasts in the classroom.

Policy Recommendations

1. Educational programs as well as accreditation organizations should consider making requirements for addressing the needs for the components of course that are didactic in nature. Scenarios are not always presented to student when performing clinical rotations; therefore situations need to be created to expose them in some capacity. Mock scenarios will have to suffice in some cases, but have the students generate could potentially create a more meaningful learning experience as well as having it accessible to go back to for review. Clinical application of skills, in particular in medical health science fields, is an essential component in preparation for employment and relying solely on in class demonstrations and practice is outdated and insufficient as this can be seen in the student peer evaluations of their classmates. The traditional means of instruction are still effective, but based on the trends of the changes to the program requirements, adjustments need to be made. Costs are associated with this incorporation of technology and if the accrediting bodies require then this will give the individual programs justification within their institutions.

2. Students within medical health science programs need avenues to improve upon their critical thinking skills and clinical application of skills learned in laboratory and lecture course structures. Requiring students to create digital media for themselves, their current classmates, and future students fosters the need for mastery in such to teach to a fellow student. Incorporating technology within these courses facilitates the practice of presenting information that is in line with the change in direction from historical best practices to evidence based practice.

The premise behind evidence based practice is to research the most current form of treatment by deciphering which information that is gathered and implementing the most appropriate plan of care. Students who would have to present their findings would not only prepare them technically about how to do an appropriate search, but also how they came to the conclusions and justifications.

Recommendations for Further Research

1. The need to produce statistical data, significant or not, would make it more conclusive whether or not serious policy changes need to be made. Positive, negative or neutral data results can all be helpful because it can determine the need for change and if so to what extent. Increasing the sample size could potentially improve the potential for more significant data and should be considered.

2. A mixed method approach would be a more thorough approach to be able to better extrapolate policy implications when able to produce data both quantitatively and qualitatively. The ability to compare results from both the statistical results as well as the comments surmised can help to explain the outcomes. Qualitative research allows for a more flexible research design guided by the findings of the interviews as well as avoiding assumptions the researcher has prior to the study. Additionally, it allows for understanding the meaning of the issues to the participants and take a more expansive look of how the issue being examined plays into the participants entire life. Some times when data is not statistically significant, but shows certain trends, assumptions may be able to be

drawn when examining the interview results. Researchers may be able to further extrapolate with the commentary from the subjects.

3. As with many research studies, compliance, cooperation and completion of all components of the study can be very challenging. The need to exclude cases that were not completed enough may have accounted for the lack of statistical significance in the scores.

Conclusion

Medical health science fields as well as the educational programs that prepare prospective professionals are seeing a shift to evidence based practice. The impression of historical practice is no longer sufficient. Constant research to maintain the most up to date practice needs to occur and presentation to peers and colleagues will follow. Preparing students for a future of active learning and educating members of medical teams is a necessary skill in the workforce. The ability of instructors to prepare students in the classroom will not only teach them the clinical skills but the application in the field.

Addressing the needs of the learners and keeping up with the changing environment of the proverbial classroom is essential as programs prepare students for their future profession. The virtual classroom that allows students to prepare, review or instruct will gradually increase as the volume of students in the programs grow and the walls of the institutions reach their limits. Taking some of the lecture instructional time out in conjunction with more clinical application time may be something that is seen more as accrediting bodies continue to examine the requirements that determine if a student is proficient. One of the main premises of evidence based practice is to research

the most appropriate course of action for the needs of the patient. It is no longer

acceptable to justify plan of care based on historical practice. This will impact the time

spent in the classroom and the time needed for preparation. Although there is not

conclusive evidence that the use of podcasting has a positive impact on learning

acquisition it is a technique that will continue to intertwine itself within the classroom.

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APPENDIXES

Appendix A – Instruments

PRESENTATION EVALUATION - INSTRUCTOR

Name: **Date:**

Podcast or Traditional

Injury: **Grade:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Was the topic presented clear?

very clear   somewhat clear   somewhat unclear   very unclear

Did the presenter speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear

Did the speaker project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Did the speaker ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did the speaker answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily   very unsatisfactorily

Was the speaker prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared

Was the presenter comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable

Did you learn anything new from this presentation?

very new information   somewhat new information   somewhat old information   very old information

Injury Protocol Specific:
Did the speaker present the specific injury?

well explained   somewhat explained   somewhat unexplained   injury not presented

Did the speaker present goals for the therapeutic exercise program?

thorough goals presented   many goals presented   some goals presented   no goals presented

If goals were presented:
Were the goals presented appropriate to the injury?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did the speaker present exercises appropriate to the goals presented?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Indicate by circling any or all of the following if they were demonstrated or discussed during the presentation. Also, write some specific examples.

Flexibility/ROM exercises

    Frequency   Intensity   Time   Appropriate   Progressions

Examples presented:

Proprioception

    Frequency   Intensity   Time   Appropriate   Progressions

Examples presented:

Plyometrics

    Frequency   Intensity   Time   Appropriate   Progressions

Examples presented:

Proprioceptive Neuromuscular Facilitation

    Frequency   IntensityTime   Appropriate   Progressions

Examples presented:

Strength

	Frequency	Intensity Time	Appropriate	Progressions

Examples presented:

Cardio

	Frequency	Intensity Time	Appropriate	Progressions

Seton Hall University
School of Health and Medical Sciences
Department of Athletic Training
GMED 6018 Therapeutic Exercise

PRESENTATION EVALUATION - STUDENT

Name: **Date:**

Podcast or Traditional

Injury: **Grade:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Was the topic presented clear?

very clear   somewhat clear   somewhat unclear   very unclear

Did the presenter speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear

Did the speaker project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Did the speaker ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did the speaker answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily   very unsatisfactorily

Was the speaker prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared

Was the presenter comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable

Did you learn anything new from this presentation?

very new information   somewhat new information   somewhat old information   very old information

Injury Protocol Specific:

Did the speaker present the specific injury?

well explained   somewhat explained   somewhat unexplained   injury not presented

Did the speaker present goals for the therapeutic exercise program?

thorough goals presented   many goals presented   some goals presented   no goals presented

If goals were presented:
Were the goals presented appropriate to the injury?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did the speaker present exercises appropriate to the goals presented?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Seton Hall University
School of Health and Medical Sciences
Department of Athletic Training
GMED 6018 Therapeutic Exercise

PRESENTATION EVALUATION - SELF

Name: **Date:**

Podcast or Traditional

Injury: **Grade:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Was the topic presented clearly?

very clear   somewhat clear   somewhat unclear   very unclear

Did you speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear

Did you project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Did you ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did you answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily   very unsatisfactorily

Were you prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared

Were you comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable

Did you learn anything new from this presentation?

very new information   somewhat new information   somewhat old information   very old information

Injury Protocol Specific:
Did you present the specific injury?

well explained   somewhat explained   somewhat unexplained   injury not presented

Did you present goals for the therapeutic exercise program?

thorough goals presented many goals presented some goals presented no goals presented

If goals were presented:
Were the goals presented appropriate to the injury?

Very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Did you present exercises appropriate to the goals presented?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate

Presentation Mode Specific:
Did you enjoy the format of the presentation?

very enjoyable   somewhat enjoyable   somewhat un-enjoyable   not enjoyable

List several pros of the format:

List several cons of the format:

Kean University
Department of Athletic Training
PED 3504 – Therapeutic Modalities

PRESENTATION EVALUATION - INSTRUCTOR

Evaluator Name: **Date:**

Podcast or Traditional

Modality/Topic: **Presenter Name:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant   N/A

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Was the topic presented clear?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did the presenter speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did the speaker project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately N/A

Did the speaker ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Did the speaker answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately N/A

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily   very unsatisfactorily N/A

Was the speaker prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared   N/A

Was the presenter comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable   N/A

Did you learn anything new from this presentation?

very new information   somewhat new information   somewhat old information   very old information
          N/A

Modality Protocol Specific:
Did the speaker present the specific modality?

well explained   somewhat explained   somewhat unexplained   modality not presented   N/A

Did the speaker present goals for the therapeutic modality?

thorough goals presented   many goals presented   some goals presented   no goals presented N/A

If goals were presented:
Were the goals presented appropriate to the modality?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate   N/A

Did the speaker present modality appropriate to the goals presented?

Very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate   N/A

Indicate by circling any or all of the following if they were demonstrated or discussed during the presentation. Also, write some specific examples.

1. Brief description of modality and the basics of how it operates

        _____

2. Physiological effects that the modality induces

        _____

3. Indications/Contraindications

        _____

4. Precautions – Situations that could cause harm if the clinician Is not careful

        _____

5. Application technique

        _____

   a. Prepare patient

      1. Explain what the patient should expect to feel

            _____

      2. Remove clothing, bandages, braces as necessary

            _____

3. Position patient in comfortable position

_____

b. Application parameters

1. Turn on unit

_____

2. Adjust the parameters as needed - dosage, length of application, etc.

_____

3. Check the patient's response and readjust the output as needed

_____

4. Frequency of application – e.g., multiple times per day, once a day, etc.

_____

5. Duration of therapy - e.g., 3 days, 3 weeks, varies

_____

c. Post application tasks

1. Equipment removal, patient clean-up

_____

2. Instruct patient about what they should feel after treatment

_____

3. Any other instructions for patient – activity level or other treatment required

_____

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Kean University
Department of Athletic Training
PED 3504 – Therapeutic Modalities

PRESENTATION EVALUATION - STUDENT

</div>

Evaluator Name: **Date:**

Podcast or Traditional

Modality/Topic: **Presenter Name:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant   N/A

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Was the topic presented clearly?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did the presenter speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did the speaker project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately very inappropriately N/A

Did the speaker ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Did the speaker answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately very inappropriately   N/A

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily very unsatisfactorily N/A

Was the speaker prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared   N/A

Was the presenter comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable   N/A

Did you learn anything new from this presentation?

very new information   somewhat new information somewhat old information very old information
          N/A

Modality Protocol Specific:
Did the speaker present the specific modality?

well explained   somewhat explained   somewhat unexplained   modality not presented   N/A

Did the speaker present goals for the therapeutic modality?

thorough goals presented   many goals presented   some goals presented   no goals presented N/A

If goals were presented:
Were the goals presented appropriate to the modality?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Did the speaker present modality appropriate to the goals presented?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Kean University
Department of Athletic Training
PED 3504 – Therapeutic Modalities

PRESENTATION EVALUATION - SELF

Evaluator Name: **Date:**

Podcast or Traditional

Modality/Topic: **Presenter Name:**

Please circle your responses below:

Overall Presentation:
Was the information presented relevant?

very relevant   somewhat relevant   somewhat irrelevant   very irrelevant   N/A

Was the content appropriate to the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Was the topic presented clearly?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did you speak clearly?

very clear   somewhat clear   somewhat unclear   very unclear   N/A

Did you project appropriately so that all could hear the presentation?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately N/A

Did you ask appropriate questions of the audience?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Did you answer questions appropriately from the audience?

very appropriately   somewhat appropriately   somewhat inappropriately   very inappropriately N/A

Were questions answered satisfactorily?

very satisfactorily   somewhat satisfactorily   somewhat unsatisfactorily   very unsatisfactorily N/A

Were you prepared for the presentation?

very prepared   somewhat prepared   somewhat unprepared   very unprepared   N/A

Were you comfortable with the subject matter?

very comfortable   somewhat comfortable   somewhat uncomfortable   very uncomfortable   N/A

Did you learn anything new from this presentation?

very new information   somewhat new information   somewhat old information   very old information
        N/A

Modality Protocol Specific:

Did you present the specific modality?

well explained   somewhat explained   somewhat unexplained   modality not presented   N/A

Did you present goals for the therapeutic modality?

thorough goals presented   many goals presented   some goals presented   no goals presented N/A

If goals were presented:

Were the goals presented appropriate to the modality?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Did you present modality appropriate to the goals presented?

very appropriate   somewhat appropriate   somewhat inappropriate   very inappropriate N/A

Presentation Mode Specific:

Did you enjoy the format of the presentation?

very enjoyable   somewhat enjoyable   somewhat un-enjoyable   not enjoyable   N/A

List several pros of the format:

List several cons of the format: