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The Use of Distance Education for Continued Professional Education by Physical Therapists in the State of Pennsylvania

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THE USE OF DISTANCE EDUCATION FOR CONTINUED PROFESSIONAL EDUCATION BY PHYSICAL THERAPISTS IN THE STATE OF PENNSYLVANIA

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Title: The Use of Distance Education for Continued Professional Education by Physical Therapists in the State of Pennsylvania

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Physical therapists are licensed in all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. The State Board of Physical Therapy within each state regulates licensure and the majority of the states mandate continuing professional education (CPE) as a requirement for renewal. In Pennsylvania, the practice act was amended on July 4, 2008 requiring physical therapists to complete 30 hours of CPE during each biennial renewal period. This new act became effective December 22, 2012 with the first cycle beginning on January 1, 2013.

Many physical therapists express challenges in acquiring CPE indicating barriers such as stress with caseload size, travel to courses from rural locations, time restraints and commitments to family and work. Distance education (DE), defined as the application of communications and electronic devices that enable students to receive instruction from a distant location, may offer flexibility in CPE for physical therapists.

This study investigated the use and adoption of DE to meet continuing education requirements by physical therapists using an adapted survey. Email invitations with an anonymous link to the survey were sent to 2047 Pennsylvania physical therapists and a total of 361 completed online surveys were attained.

57% of the subjects reported incorporating some form of DE into their 30 required CPE hours over the last 24 months. On average, 12.25 of the 30 required CPE hours were completed through DE. The most frequent type of DE used by the subjects was Internet/World Wide Web, followed closely by print. When evaluating the innovation-decision process, subjects considered course content, quality and applicability of the information first, and time away from work or home last. The most commonly used provider of DE is a national professional organization. Those subjects that report using distance education confirm that their distance education experience was positive and believe that their CE experience will be positive in the future.

Using Rogers's method to determine rate of adoption, it appears that Pennsylvania physical therapists are already adopting DE. The results of this study indicate that, DE has good relative advantage, good compatibility, good observability and no evidence of complexity.

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CHAPTER ONE

INTRODUCTION

Certainly not a new concept, Continuing Professional Education (CPE) existed as early as the Middle Ages when ongoing education for professional practitioners was provided through apprenticeships and guild systems (Hayes & Wilson, 2000). It was not until 1960, that this practice of ongoing education throughout a career was named continuing professional education (CPE). The expanding technology, rapid growth of knowledge bases, and the emergence of new professions of the 1960's demanded more and more structured education for professionals later in, or throughout, their careers. With this rapid growth for professions, came a public perception of responsibility, accountability, and service that continues to be called to question by government agencies, consumers, and the professionals themselves (Anonymous, 2006; Hayes & Wilson, 2000).

CPE serves several needs for aspiring professional practitioners. It enables practitioners to keep abreast of new knowledge, maintain and enhance their competence, progress from beginning to mature practitioners, advance their careers through promotion and other job changes, and even move into different fields (Hayes & Wilson, 2000). Professionals desire to continue learning all of their lives, both within their profession and for personal satisfaction (Jones, 1999). Through CPE, professionals seek to improve performance, efficiency, reliability, and aesthetics and to reduce costs. Professionals desire to share ideas and envision new ways to improve quality of life. This desire may

be even greater in medical professions such as physical therapy where the advances in knowledge and technology are rapid and society demands quality results.

Specifically in the physical therapy profession, physical therapists recognize their responsibility toward professional development and lifelong learning. Physical therapist practice is based on the seven core values of professionalism: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility (Anonymous,1997). Physical therapists are obligated to participate in professional development to ensure continued competence and to strive toward the achievement of advanced knowledge skills and abilities for excellence in practice (Anonymous,1997).

Participation in continuing education is a way to prevent professional obsolescence. The concept of obsolescence assumes that physical therapy practitioners who fail to keep up with new knowledge, skills and scientific information become obsolete in their professional knowledge and skill set at the same rate at which scientific knowledge increases (Grant, 1994). Although CPE is not the only way to stay on top of new knowledge, skills and scientific information, it has been shown to be an effective method for improvement in professional practice and patient health outcomes (Landers, McWhorter, Krum, & Glovinsky, 2005). In addition the American Physical Therapy Association (APTA) supports the concepts of continued competence, lifelong learning, and ongoing professional development in its Vision Statement for Physical Therapy 2020, the Standards of Practice for Physical Therapy, and the Physical Therapy Code of Ethics (Anonymous, 2004). The APTA proposes that professional development should include participation in continuing education courses, academic courses, independent

study, on the job training, and a wide variety of other methods for acquiring new information and training (Wojciechowski, 2006).

The driving force for CPE in physical therapy is society. Society has become aware of the need for lifelong learning in the professions to ensure a professional's currency and competence, and the individual professions, including physical therapy, have responded by establishing continuing education requirements for licensure or certification renewal (Anonymous, 2004; Hayes & Wilson, 2000). This driving force is encouraged by, "1) widespread public concern about professional competence and performance; 2) failure of the professions and their employers to police incompetent and impaired professionals; 3) public perceptions of inflated costs for services rendered; and 4) unequal access to quality care and services" (Flagello, 1998, p.33). These forces are strong in the health professions, as their patients look for these professionals to participate in regular updates on changes in practice. Cervero also points out that frequent lawsuits have created an emphasis on participating in CPE (2001). Many professional organizations, including over 30 Physical Therapy State Boards, have now mandated CPE for licensure renewal. These mandates for continuing education vary in both hours (10-20 hours per year) and in length of renewal period (1-3 years) (Landers et al., 2005).

Physical therapists are licensed in all 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands. Licensure is regulated by the State Board of Physical Therapy in each state and must be renewed on a regular basis. The majority of the states mandate CPE as a requirement for renewal. Specifically in Pennsylvania, the practice act was amended on July 4, 2008 requiring physical therapists to attend and complete 30

hours of CPE during each biennial renewal period (Pennsylvania State Board of Physical Therapy, 2011). For physical therapists in Pennsylvania with a Direct Access Certification, 10 of these hours must be in evaluative procedures (Pennsylvania State Board of Physical Therapy, 2011). This act became effective December 22, 2012 when the State Board of Physical Therapy promulgated the rules and regulations with the first cycle beginning on January 1, 2013 (The Pennsylvania Bulletin, 2012).

The state board mandates for CPE and the desire of the physical therapy professional to stay current in the field create a demand for accessible, quality CPE programs in physical therapy. Unfortunately, many physical therapists express challenges in acquiring this mandated or desired CPE. Bourne, Dziedzic, Morris, Jones and Sim conducted a study in 2007 of 200 community physical therapists in the UK. Researchers used a survey and focus groups to identify the perceived barriers to obtaining the required CPE. In this study these authors found that a lack of cover for absent colleagues during sick leave, annual leave and study leave were contributing problems as well as stress with caseload size (Bourne, Dziedzic, Morris, Jones, & Sim, 2007). Austin and Graber performed a qualitative study on 23 physical therapists at 6 hospitals in Illinois (Austin & Graber, 2007). The results of the study identified the course travel distance as being the most pronounced barrier for those living in rural areas and the number one overall barrier as the need to balance CPE with time restraints. In particular, physical therapists with commitments to family and work found the mandated requirements of CPE challenging. When suggestions were made for alternative methods of CPE participants suggested: courses offered during the work week, shortened CPE

sessions, increased home based CPE options, and courses brought to their place of employment. Additionally, participants stated that control over the pacing of the CPE was important and they favored the Internet and self-study opportunities. Interestingly, although many of the participants were in favor of Internet based CPE, few had any first-hand experience using the internet for CPE (Austin & Graber, 2007).

Continuing professional education is a crucial component to professional development as a physical therapist. Not only is it identified by the professional as a lifelong goal, the APTA defines it as a responsibility of the physical therapy professional, and it is also mandated by regulatory State Boards of Physical Therapy for licensure renewal. As contemporary practice develops and changes, physical therapist must continue their education to establish continued competence and meet required mandates for quality healthcare. Unfortunately with the demands of professional and personal life, physical therapists are expressing a need for more accessible CPE that allows flexibility and self-study. Distance education may offer convenience and flexibility in CPE.

Distance education can mean many things. The United States department of educational research and development defines distance education as, "the application of telecommunications and electronic devices, which enable students and learners to receive instruction from some distant location" (Casey, 2008, p.46). Delivery methods for distance education may include print based self-study, audiotape, videotape, audio conferencing, videoconferencing, CD ROM, or web-based activity (Spector, 2009).

Many traditional educators view distance education with skepticism and express concerns about quality control; however, distance education has still flourished in the United States for three reasons. One, many citizens are great distances from educational institutions both geographically and socio-economically. Two, there is a thirst for education. And three, technology continues to rapidly advance (Casey, 2008).

When research on distance education is reviewed, it appears to be the perfect fit for continuing education because of the success that mature learners experience in with distance education. Throughout history, distance education overall has focused on adult education and independent learners (Wallace, 2003). The online format served these individuals best because, with the flexibility of online learning, they could combine their education with work and family obligations. These individuals are experienced, motivated, and driven which makes them a better match for online learning. Available literature supports the notion that only the self-motivated and self disciplined students, with adequate reading and writing ability, good time management skills and comfort level with computers are most likely to succeed in online learning (Li, 2002). Many feel that the more mature students, such as graduate students, have already had socialization experience and are more prepared to learn in the online environment. The undergraduate student may miss out on the social benefits, get bored and depressed and drop out. The general theory underpinning distance learning is constructivist, assuming that learners build their own meaning and understanding of a topic and discover basic principles for themselves (Southernwood, 2008). The mature learner will be more equipped to succeed in the online learning environment.

Malcolm Knowles introduced the most widely accepted concept of adult learning in 1980, which he called Andragogy. This concept represented a continuum ranging from teacher directed to student directed learning, more specifically pedagogy to andragogy (Knowles, 1990). For example, an adult who knows little or nothing about a subject will benefit from teacher directed learning, but only until they have enough knowledge to direct their own learning. Then they would prefer a more self-directed style of learning. With licensed physical therapists being adult learners who have completed a formal educational program and possess a basic skill set, one would assume that they would be the perfect consumers for distance education.

Although there has been a great deal of research addressing the feasibility of distance education and the use of technology in the formal education arena, little research has been conducted in the professional development setting where training for the specific occupation of an adult is the goal (Donavant, 2009a). In addition to the lack of research on CPE in distance education, research on adult learning principles and adult educational techniques in professional development is almost nonexistent (Donavant, 2009b). Thus the CPE via online education terrain is virtually unexplored.

With a history that spans three centuries, distance education has the ability to meet the needs of professionals who are distant from educational institutions either geographically or socio-economically (Casey, 2008), and to allow the self-directed pacing that the adult learner prefers. The rapid advancement of technology, the use of the World Wide Web, and learning management systems create a flow of information

between the teacher and learner as well as introduce the interpersonal aspects of communication (Casey, 2008).

Distance education as CPE dates back to the basic correspondence course in 1852 that taught the Pitman Shorthand training. It used the United States postal service to connect the teacher and learner. Other early programs instructed mine safety through correspondence with the University of Chicago in 1892. Radio was incorporated in distance learning in 1921 and television in 1934. The development of the microprocessor in 1971 was the final missing piece that facilitated a free flow of information between the teacher and the learner and interpersonal aspects of communication (Casey, 2008). Now with addition of the World Wide Web and the Internet, social integration can be incorporated.

There is no doubt that that the process of distance education is being heavily used to enable continuing education (Jones, 1999). Until recent years, most CPE involved professionals gathering in a single location to hear a lecture, participate in a workshop or seminar, or observe practice. Distance education has the potential to radically change the format and delivery of CPE, providing convenient, cost effective, educationally equal or superior alternatives to traditional offerings (Hayes & Wilson, 2000).

Opportunities for CPE in the form of distance education are increasing rapidly for physical therapy professionals in Pennsylvania. An updated list of the approved CPE courses can be found on the Pennsylvania State Board of Physical Therapy website. The most recent list posted on April 11, 2011 lists a total of 563 courses ranging from 1 contact hour to 98 contact hours. Of these courses 273 are listed as distance education.

This is 45% of the total approved CPE courses for physical therapists in the state of Pennsylvania. Apparently the Pennsylvania State Board of Physical Therapy acknowledges distance education and approves it for CPE. In a study by Bridgett Piernik on the use of distance education by allied health professionals in the state of Texas in 2004, physical therapists were found to be the allied health professionals that had used distance education most recently and most frequently (Piernik-Yoder, 2004). It appears that at least in the states of Texas, and Pennsylvania, physical therapists are potential "adopters" of distance education.

Statement of the Problem

The Pennsylvania State Board of Physical Therapy now mandates Continuing Professional Education (CPE) for physical therapists' biennial licensure renewal. In response to the growing needs for CPE, distance education for physical therapists is developing at a considerable rate. Thus, it is the expectation that professionals will shift away from traditional offerings and adopt distance learning for CPE. To date there are few studies revealing the adoption of distance learning as CPE and there are no studies specifically on adoption, outcomes or desires of physical therapists to use distance education to meet mandated CPE requirements.

Purpose of the Study

The purpose of this study was to investigate the use and adoption of distance education to meet continuing education requirements by physical therapists in the state of Pennsylvania. This study described this population's use of distance education for this

purpose. It also explored whether or not specific characteristics affect the use and adoption of distance education to meet mandated continuing education requirements by the study participants.

Research Questions

1) How are physical therapists in Pennsylvania using distance education technologies to meet mandated continuing education requirements?

2) What characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapists' in Pennsylvania use of distance education to meet mandated continuing education requirements?

3) Which demographic characteristics such as age, educational level, living area, gender, area of expertise, or job position influence physical therapists' use of distance education to meet mandated continuing education requirements in Pennsylvania?

Significance of the Study

In Pennsylvania, the physical therapy practice act was amended on July 4, 2008 requiring physical therapists to attend and complete 30 hours of continuing professional education (CPE) during each biennial renewal period (PA P.L. 293 No. 38, section 16). This act became effective December 22, 2012 when the State Board of Physical Therapy promulgated the rules and regulations with the first cycle beginning on January 1, 2013. This sudden increase from no requirement to a requirement of 30 hours has created a high demand for continuing education course offerings for physical therapists.

In response to this promulgation, distance education for physical therapists is developing at a considerable rate. The Pennsylvania State Board of Physical Therapy website lists courses approved for continuing education credit on their website. At this time, 45% of the approved courses are offered in the online environment. Thus, it is the expectation that physical therapists will shift away from traditional offerings and adopt distance learning for continuing professional education (CPE). As these continuing education opportunities in physical therapy become increasingly driven by available technology as well as negatively affected by constraints such as time and eroding financial support, it is important to investigate the physical therapists' use of this method of delivery.

Healthcare and education literature regarding this area focuses primarily on the experiences of physicians and nurses. To date no published studies exist regarding the perceptions of physical therapists on distance learning for continuing professional education and many questions remain unanswered regarding the physical therapists' use and adoption of distance education as CPE. Factors such as knowledge, previous experience, interest level, and physical therapists' perceived attributes of distance education as well as the impact of demographics on the use and adoption of distance education all warrant further exploration. It is only with this investigation that those who develop and deliver continuing education will ensure that they are meeting the expectations and needs of physical therapists.

Theoretical Framework

In order to effectively explore the use of distance education, as a means for Pennsylvania physical therapists to meet their requirements for continued education, it is helpful to use Rogers' Diffusion of Innovations theory. This theory of innovations is one of the most researched and dominant models in the study of innovation adoption behavior (Demir, 2006), and it provides a framework for the motivation and willingness of physical therapists to use distance education for CPE. Rogers describes an innovation as an idea perceived as new by an individual or another unit of adoption (Rogers, 1962). The process by which an innovation spreads is referred to as diffusion (Rogers, 1962). Rogers' theory offers great detail on the diffusion process identifying four elements of diffusion: innovation, communication channels, time and the social system (Rogers, 1962).

The first element, innovation, involves an innovation-decision process that happens slowly over a period of time through a series of decisions and actions. Rogers describes this process as consisting of 5 stages: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003).

Communication channels, the second element of diffusion, is essential in the adoption of an innovation. This is the process by which the individual adopters obtain a mutual understanding through the sharing of information.

Time refers to the rate of adoption of an innovation. This is the speed at which the social system's members adopt an innovation. Rogers lists 5 characteristics that explain this timing: "relative advantage, compatibility, complexity, trialability, and

observability" (Rogers, 2003, p.16). Innovations that are perceived by social system members as having less complexity and more of the other 4 characteristics are the ones that will be adopted more quickly (Rogers, 2003).

There can be differences between the rates of adoption for the same innovation with in different social systems, and this is described in the last element of diffusion, social system. Rogers grouped adopters into five categories based on their degree of innovativeness: "innovators, early adopters, early majority adopters, late majority adopters, and laggards" (Rogers, 1962, p.25).

Distance education is an emerging innovation as a means for physical therapists to obtain required CPE hours. The use of Rogers' theoretical framework to consider why a potential user may consider distance education allows a thorough exploration of the use of distance education by physical therapists in the state of Pennsylvania.

Limitations of the Study

The Pennsylvania State Board of Physical Therapy reports that there are 13,279 physical therapists licensed in the state of Pennsylvania, however less than one third of these are members of the Pennsylvania Physical Therapy Association. For this reason, email addresses of all 13, 279 licensed physical therapists are not available. A limitation of this study was the inability to obtain a complete list of licensed physical therapists from which to select a random sample. The subject pool consisted of a convenience sample of licensed physical therapists that are active members of the Pennsylvania Physical Therapy Association, thus they may be physical therapists that are more active in continuing education of all kinds.

Another limitation is the survey design of the study. The survey method relies on a self-report method of data collection. Intentional deception, poor memory, or misunderstanding of the question can all contribute to inaccuracies in the data. Furthermore, the survey method is descriptive rather than explanatory and allows very little insight to cause and effect relationships.

Summary

In order to maintain a level of competence in the profession, Pennsylvania licensed physical therapists are being mandated to complete 30 hours of continuing professional education every two years. In a response to this demand for continuing professional education, distance education offerings have increased making up 45% of the approved courses offered. It is expected that physical therapists will shift away from traditional offerings and migrate toward distance education to complete the new continuing education requirements. Many questions remain unanswered on the use and adoption of distance education by physical therapists for CPE and to date no published studies exist regarding their perceptions. This information is needed to ensure that those who develop and deliver CPE are meeting the expectations and needs of physical therapists.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This study was designed to explore the use of distance education as a method of continuing professional education for physical therapists to meet mandated continuing education requirements and to enhance their professional development. This chapter presents a review of the literature conveying the essential research foundation as well as the relevant theory used to guide this study. The review of the literature will first define the practice of continuing education as a function of adult learning specific to the discipline of physical therapy. Then, the challenges that physical therapy professionals express with attaining CPE will be discussed. Next an overview of the growth of distance education for continuing education is explored and applied to the practice of CE. After that, Rogers' Diffusion of Innovations Theory is presented as a means to view the emergence of distance education to meet the needs of the physical therapy professional for continuing education.

Continuing Professional Education

Continuing professional education (CPE) is not a new concept. As far back as the Middle Ages professional practitioners acquired CPE through apprenticeships and guild systems (Hayes & Wilson, 2000). The name CPE came about in the 1960's when expanding technology, rapidly growing knowledge bases, changes within professions, and the development of new professions brought the need for additional education throughout one's career. CPE is defined today as:

> ….the education of professional practitioners, regardless of their practice setting, that occurs after their initial curriculum and enhances their learning throughout their career. This education can span several days or several years and serves the purpose of keeping professionals abreast of new knowledge, maintaining and enhancing their competence, progressing them to more mature clinicians, and even advancing their careers through promotion or position changes. (Jones, 1999, p.8).

It is universally accepted that CPE refers to programs that are designed to give professionals additional knowledge, but are not intended to lead to degrees. These formal post baccalaureate sessions are referred to as "short courses" and often lead to a certificate of attainment or accomplishment that may be required for re-certification or licensure (Jones, 1999). Short courses are carefully planned programs that present up to date material that is practically oriented. The professionals that enroll in these courses tend to be demanding and hold high expectations of rapid, effective learning. Providers of these courses may be universities, industries, vendors, professional societies, or educational institutions founded with the sole purpose of providing continuing education. Faculty members can be university faculty or outside experts (Jones, 1999).

Professionals that participate in CPE engage in lifelong learning where the term describes the participation more than the process. The goal is to improve performance, efficiency, reliability, and aesthetics and to reduce costs. Much of the original CPE

provided in the Engineering profession provided a vision for new ways to improve the quality of life for people and allowed professionals to share ideas, to become aware of changes in their practice, and to meet the desire to continue learning throughout life. (Jones,1999).

The professional continuing education market is estimated at 41 to 76 million adults (Anonymous, 2006) creating a demand in the marketplace. The majority of these adults has college degrees and high paying jobs or is employed by companies that are willing to pay for their continuing education (Anonymous, 2006). "The adage, the truly educated never graduate, has come to exemplify a wide cross section of America, if not the world, in most occupations and professions" (Anonymous, 2006).

A demand for CPE is created as government agencies, consumers and professionals themselves question the public perception of responsibility, accountability and service among professionals. It is logical that the individual professions respond by mandating CPE for licensure, certification, or practice. Professionals take the position that public confidence is enhanced by the appearance of these mandates.

Government agencies and the public see the acquisition of CPE as an assurance of continued competence in a profession. Competence entails three components that need to be mastered: Knowledge, the body of information of the profession; Skills, the use of professional knowledge to perform certain tasks; and Performance Abilities, the application of knowledge and skills in the practice setting (Hayes & Wilson, 2000).

Continuing Professional Education in Physical Therapy

Specifically in the physical therapy profession, physical therapists recognize their responsibility toward professional development and lifelong learning. Physical therapist practice is based on the seven core values of professionalism: accountability, altruism, compassion/caring, excellence, integrity, professional duty, and social responsibility (Anonymous,1997). Physical therapists are obligated to participate in professional development to ensure continued competence and to strive toward the achievement of advanced knowledge skills and abilities for excellence in practice (Anonymous, 1997).

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and a wide variety of other methods for acquiring new information and training (Wojciechowski, 2006).

The driving force for CPE in physical therapy is society. Society has become aware of the need for lifelong learning in the professions to ensure a professional's currency and competence, and the individual professions, including physical therapy, have responded by establishing continuing education requirements for licensure or certification renewal (Anonymous, 2004; Hayes & Wilson, 2000). This driving force is encouraged by "1) widespread public concern about professional competence and performance; 2) failure of the professions and their employers to police incompetent and impaired professionals; 3) public perceptions of inflated costs for services rendered; and 4) unequal access to quality care and services" (Flagello, 1998, p.33). These forces are strong in the health professions because patients look for these professionals to keep up to date with changing information. Cervero also points out that frequent lawsuits have encouraged CPE with in these professions (Cervero, 2001). Many professional organizations, including over 30 Physical Therapy State Boards, have now mandated CPE for licensure renewal. These mandates for continuing education vary in both hours (10-20 hours per year) and in length of renewal period (1-3 years) (Landers et al., 2005).

Although many groups have promoted the appearance of accountability by requiring a certain amount of CPE for re-certification or licensure renewal, increased consumer awareness and growing incidence of litigation have made it clear that appearance is not enough. It is important that CPE is not used as a panacea. Wilson and Hayes state, "Performance is rarely changed by any single variable (Hayes, 2000). CPE

does have the potential to be an important component of prompting competent practice, but it is neither a guarantee of competence nor the sole answer to competence assurance.

Adult Learning Theories

Knox professed that to be successful, continuing educators need to develop deliberate strategies for increasing personal proficiency (Merriam, 1993). In his proficiency theory, he defined proficiency as the capability to perform satisfactorily if given the opportunity (Merriam, 1993). This performance would be comprised of a combination of attitude, knowledge and skill. When comparing proficiency ideas and competence based approaches, competence based education emphasizes achievement of minimal standards of performance in educational tasks, while proficiency oriented continuing education emphasizes achievement of optimal standards of proficiency related to adult life roles. Knox believes that proficiency-oriented learning has the potential to help adults achieve at the highest possible level by promoting excellence or optimal learning (Merriam, 1993).

The most important characteristic of CPE is that it is education for adults. Professional adults have a level of knowledge and skill in their field and are motivated by the need to stay current in their profession. To explore the best options for CPE it is helpful to look at theories of teaching and learning.

Researchers have placed teaching and learning into variable theoretical dimensions and the most enduring theories for both children and adults have been the behaviorist orientation and the cognitive orientation (Birzer, 2004). Behaviorism focuses on the objective and rarely acknowledges subjective human feeling (Birzer,

2004). The behavioral teacher would propose that learning is accomplished by a change in behavior that can be objectively and precisely measured. The cognitivist orientation proposes that there is an interpretation of the learning experience and this then gives meaning to the events (Grippin and Peters, 1984). The cognitive teacher uses a lecture approach and proposes that the learner retains logically presented information.

Birzer identifies two problems posed by the behavioral and cognitive orientations, when attending to the adult learner (Birzer, 2004). First he states that the cognitive and behavioral methods propose the same uniform approach regardless of the subject matter. Second, there is minimal participation or interaction by the learner. This would then lead the researcher to predict that a more humanistic orientation to learning would be better for the adult learner.

The first research on adult learning was between 1928 and 1990 and it focused mostly on adult intelligence and other aspects of learning such as the ability to remember, to process information, and to problem solve (Merriam, 1993). It is difficult to generalize the results of these studies because they were performed in artificial environments. The most promising research on adult learning has been done more recently and involves the consideration of experience, personal history, social and cultural contexts (Merriam, 1993). Results of these studies implicate that adults can learn, and depending on how learning is measured and assessed, adults can learn as well as young people.

Malcolm Knowles was the first to propose the theoretical concept that adult learners are different from children as learners (Knowles, 1990). His concept of

andragogy describes the most accepted set of principles to guide the practice of adult education. Andragogy consists of five basic assumptions that form the basis for the principles of adult learning (Knowles, 1990):

- Adult's self-concept is grounded in their ability to see themselves as self-directed human beings. This implies that adults want more control over their learning activities.
- Adults, through life experience, accumulate a vast "reservoir of experience," which serves as a resource for further learning. Unlike children, adults are prepared through their life experiences to direct their learning experiences.
- Adults' readiness to learn is linked to their life cycle roles and responsibilities.
- Adults then to be more problem-centered rather than subject-centered in learning, which suggests that hands-on and how-to courses are more favorable than detailed theory-based learning activities.
- Adults are driven to learn by intrinsic factors.

Of the concepts proposed in andragogy, that of self directed learning is particularly relevant in CPE. Adults seeking CPE are independent and will therefore be self-directing. These adults have met minimal standards of knowledge in their profession and therefore would not perform as well with teacher directed learning. They will have sufficient knowledge to direct their own learning.

Knox introduced an additional concept called proficiency theory that also fits well with CPE. Proficiency theory posits that adult learning is motivated by a discrepancy between current and desired levels of proficiency. Much of the motivation for CPE in practitioners is due to a desire to keep abreast of new knowledge, to maintain and enhance competence, and to progress from beginning to more mature practitioners (Hayes & Wilson, 2000). Certainly proficiency theory describes one of the most common motivations for a practitioner to seek CPE and for a government agency to require a specific amount of CPE for licensure.

Challenges for Physical Therapists

Physical therapists are licensed in all 50 states, and the District of Columbia, Puerto Rico, and the Virgin Islands. Licensure is regulated by the State Board of Physical Therapy in each state and must be renewed on a regular basis. The majority of the states mandate CPE as a requirement for renewal. Specifically in Pennsylvania, the practice act was amended on July 4, 2008 requiring physical therapists to attend and complete 30 hours of CPE during each biennial renewal period (Pennsylvania State Board of Physical Therapy, 2011). For physical therapists in Pennsylvania with a Direct Access Certification, 10 of these hours must be in evaluative procedures (Pennsylvania State Board of Physical Therapy, 2011).

The state board mandates for CPE and the desire of the physical therapy professional to stay current in the field create a demand for accessible, quality CPE programs in Physical Therapy. Unfortunately, many physical therapists express challenges in acquiring mandated or desired CPE. Bourne et al. conducted a study in

2007 of 200 community physical therapists in the United Kingdom. Researchers used a survey and focus groups to identify the perceived barriers to obtaining the required CPE. In this study Bourne found that a lack of cover for absent colleagues during sick leave, annual leave and study leave were contributing problems as well as stress with caseload size (Bourne et al., 2007). Austin and Graber performed a qualitative study on 23 physical therapists at 6 hospitals in Illinois (Austin & Graber, 2007). The results of the study identified the course travel distance as being the most pronounced barrier for those living in rural areas and the number one overall barrier as the need to balance CPE with time restraints. In particular, therapists with commitments to family and work found the mandated requirements of CPE challenging. When suggestions were made for alternative methods of CPE participants suggested: courses offered during the work week, shortened CPE sessions, increased home based CPE options, and courses brought to their place of employment. Additionally, participants stated that control over the pacing of the CPE was important and they favored the Internet and self-study opportunities. Interestingly, although many of the participants were in favor of Internet based CPE, few had any first-hand experience using the Internet for CPE (Austin & Graber, 2007).

Until recent years, most CPE involved professionals gathering in a single location to hear a lecture or participate in a workshop or seminar, or observe practice. Rapidly changing and expanding technology has altered the format of CPE and the process of distance education is being heavily used to enable continuing education. Specifically, Internet CPE is gaining popularity, and most participants are satisfied with the experience and find it to be an effective learning format (Cobb, 2004).

Opportunities for CPE in the form of distance education are increasing rapidly for physical therapy professionals in Pennsylvania. An updated list of the approved CPE courses can be found on the Pennsylvania State Board of Physical Therapy website. The most recent list posted on April 11, 2011 lists a total of 563 courses ranging from 1 contact hour to 98 contact hours. Of these courses 273 are listed as distance education. This is 45% of the total approved CPE courses for physical therapists in the state of Pennsylvania. Apparently the Pennsylavania State Board of Physical Therapy acknowledges distance education and approves it for CPE. In a study by Bridgett Piernik on the use of distance education by allied health professionals in the state of Texas in 2004, physical therapists were found to be the allied health professionals that had used distance education most recently and most frequently (Piernik-Yoder, 2004). It appears that at least in the states of Texas, and Pennsylvania, physical therapists are potential ”adopters” of distance education.

Distance Education

The United States department of educational research and development defines distance education as “the application of telecommunications and electronic devices, which enable students and learners to receive instruction from some distant location” (Casey, 2008, p.46). Delivery methods for distance education may include print based self-study, audiotape, videotape, audio conferencing, videoconferencing, CD ROM, or web based activity (Spector, 2009). Distance education has provided a highly convenient, cost effective, and educationally equal mode for continuing education using the world- wide- web (Hayes & Wilson, 2000).

Distance education actually found its roots in the CPE arena. The first distance education course in the US was the Pittman Shorthand training program that taught stenographic practices through the United States Postal Service in 1852. Other early programs taught mine safety and the first college based program was by the University of Chicago in 1892. Many of the original distance education programs were administered via educational radio shows with the first educational radio licenses granted to the University of Salt Lake City, the University of Wisconsin, and the University of Minnesota in 1921. In 1934, distance education progressed to television when the University of Iowa began broadcasting courses. However, the most significant growth in distance education began with the creation of the microprocessor by Intel Corporation in 1971. The computer was the missing link needed for a free flow of information between learner and teacher and the beginning of more interpersonal aspects of communication.

This progression outlines the growth of distance education from basic correspondence learning where the student received a set of learning materials via surface mail to todays' multiple technologies that decrease the distance between the teacher and the learner. With the development of new information technologies and creation of new technologies like wireless communications, distance education is becoming much closer to traditional face-to-face learning.

Because of this wide range of distance education opportunities, it is necessary to classify distance education considering the type of technology that was chosen to form the basis for the course. Classifications begin at the most basic correspondence course and progress to the most modern Internet based courses.

In a *traditional correspondence course,* the student works with various educational materials received through surface mail. Students will send back written assignments and results of individual research. With the technology of today, the materials sent to learners in this environment could include more sophisticated items such as video or audiotapes or CD-ROMs.

Television and radio broadcasting are often used for teaching and this is called a *broadcasting course*. This form of distance education is often integrated into a curriculum where feedback is organized in email and asynchronous conferences.

Educational forums are another type of distance education that is often used to unite students who work at the same topic into collaborative teams. In this scenario teleconferences and videoconferences are used to assist with group activities.

The personal computer allowed the beginning of the *computer assisted instruction (CAI) course*. In this course, the student uses a personal computer to access various interactive educational software programs that are generally delivered in an educational packet or tool kit. Feedback in these courses is again provided by email or teleconferencing.

With the introduction of the World-Wide-Web and the Internet, came the *Internet based course* often identified as computer-supported learning systems. This environment is created with the help of interactive web-based textbooks, email, mailing lists, chats, asynchronous forums, computer modeling, simulation programs, etc. and creates a need to further divide this classification.

Computer-supported learning systems focus on individual learners working on a local computer to accomplish cognitive learning objectives (Arasasingham, Toagepera, Potter, Martorell, & Lonjers, 2005). These systems allow a remote student access to course content through methods as simple as downloading text to as sophisticated as streaming video. Collaborative systems, often called Group Ware, range from email to online discussion groups and internet chat rooms (Arasasingham et al., 2005).

And finally, immersive presence systems or virtual reality systems use the system for immersion and the presence becomes a product of the person's psyche. To better describe the immersive presence system Lombard and Ditton use the concept of "being there" with three distinct types of transportation (Lombard & Ditton, 1997). "You are here", where the user is transported to another place, "it is here", where the objects are transported to the user and "we are together", where several communicators are transported to an area that they share. Immersion presence is becoming more widely used with the decrease in price of audio and video equipment.

Generally two of these systems are integrated together to achieve higher order learning objectives (Arasasingham et al., 2005). The first possible combination is the intersection of computer-supported learning systems and collaborative systems. This is commonly known as computer supported collaborative learning (CSCL) and is presented in the form of group support systems in the classroom or asynchronous learning networks. Combinations of these two system types have produced affective learning in the areas of communication and teamwork as well as traditional cognitive learning (Arasasingham et al., 2005).

Another combination is the integration of computer-supported learning systems and immersive systems. Combinations of these two systems have produced virtual classrooms, teleconferencing and streaming video to present lectures via the web or CD-ROM (Arasasingham et al., 2005).

The last combination is the intersection of immersive presence and collaborative systems. This falls into three common categories: entertainment, simulation, or visualization. These are commonly called multi user domains (MUDS) that were originally designed to facilitate adventure games. Later a new system was developed called MOO (MUD Object Oriented) where participants create virtual selves and interact with other participants in the real world. This type of training allows for individuals or groups to train in real world surroundings that do not restrict safety. It also allows the participants to review their actions, reflect on them, and discuss them with other group members.

It is proposed that the effective integration of all three of these systems will facilitate the achievement of psychomotor objectives in the lab environment (Arasasingham et al., 2005). At this time there are very few, if any educational programs using this multi-system method and it has been available only for research purposes.

Distance Education and Learning

Many traditional educators view distance education with skepticism and express concerns about quality control. McDaniel (McDaniel, 2004) found in a study of nine online instructors that those that did not have high technical abilities did not have high quality online classes.

> They did not know how to use chat rooms effectively, or they didn't know how to embed interactive components like Java applets, videos, or PowerPoint. Some people---it's sad to say---are just throwing their lecture notes online and thinking it's an online course (Anonymous, 2004, p.33).

A review of the literature on learning theory in general, and for technology supported learning theory, reveals that no one theory adequately explains how people learn, how an instructional system should be designed, how social interaction affects learning, or how people and technologies function best together (Koschmann & And, 1994). However, there are four stages of learning that are generally accepted: the exposure stage or first time concept, the guided learning stage or where the learner still needs help with the problems, the independent stage which is after review, and the mastery stage which is the final goal of education (Muir, 2001). The goal of the online or face-to-face instructor is to develop the student to the independent stage and then progress to the mastery stage. Depending on the student's learning style he will respond more effectively to different stimuli.

The web based educational environment does well in presenting material in a visual manner. However, not all learners are visual. Several other learning styles have been identified including but not limited to the following: auditiory, tactile, active, passive, sequential, global, sensory, intuitive, inductive and deductive (Peacock, 2001).

Kolb's learning cycle concept defends why the successful instructor must integrate several teaching methodologies into the curriculum (Muir, 2001): "students learn: 10% of what they read, 20% of what they hear, 30% of what they see, 50% of

what they see and hear, 70% of what they say, 90% of what they say and do". In distance education, an extra effort needs to be made to make learning more than just environment. There must be activities to participate in, analyze and think about.

Successful online learning puts a great deal of responsibility on the instructor. The first step to successful instruction in the online environment is adopting a constructivist model. This begins by constructing the learning environment. To do this online Muir recommends performing learning needs assessment including such things as what the target audience understands about the material and how the material might be structured for the audience (Muir, 2001). These elements then need to be linked to a presentation or instruction strategy (Muir, 2001). This may be correlated with the learning styles of the students or be a multi-sensory approach and should use the four processes of Kolb's experiential learning model (mentioned previously). Finally, one must add interactive structure to build the social component (Muir, 2001).

From her research Muir summarizes the ideal online course (Muir, 2001):

1. The online course covers the same content as a traditional course would and should be text based or cover text material.
2. The learning objectives include Bloom's Taxonomy at all six levels.
3. The teacher strategies are multi-sensory to address all learning styles.
4. The activities are multi-sensory and address all learning styles.
5. Assessments should be in many different forms and should cover the full lesson content in all six levels of Bloom's taxonomy.
6. Online courses should be accredited by a state or local entity.

7. Curriculum should be adaptable to meet the requirements of different state guidelines (if required).
8. The course should incorporate synchronous and asynchronous learning, email, and multi-media presentations using technology to its fullest.
9. The online curriculum should be available at all times (Rogers, 2003, p.25).

Throughout history, distance education overall has focused on adult education and independent learners (Wallace, 2003). The online format served these individuals best because, with the flexibility of online learning, they could combine their education with work and family. Available literature supports the notion that only the self-motivated and self disciplined students, with adequate reading and writing ability, good time management skills and comfort level with computers are most likely to succeed in online learning (Li, 2002). Many feel that the more mature students, such as graduate students, have already had socialization experience and are more prepared to learn in the online environment. The undergraduate may miss out on the social benefits, get bored and depressed and drop out. The general theory underpinning distance learning is constructivist, assuming that learners build their own meaning and understanding of a topic and discover basic principles for themselves (Southernwood, 2008).

Even with concerns about quality control, distance education has flourished in the United States for three reasons. One, many citizens are great distances from educational institutions both geographically and socio-economically. Two, there is a thirst for education. And three, technology continues to rapidly advance (Casey, 2008).

Although a great deal of research has addressed the feasibility of online education and the use of technology in formal educational settings, little research has been conducted in the CPE environment, ie. training the adult learner in his current occupation. In this same respect, empirical research on adult learning principles and adult educational techniques in professional development is almost nonexistent (Birzer, 2004). There is a dearth of studies to assist in the discovery of the best practices for Internet CPE. The training professionals of today are truly experiencing the beginning of a revolution (Donavant, 2009b).

Rogers' Theoretical Framework

Distance education as a method of CPE for Physical Therapists is an innovation and in spite of America's generally favorable attitude toward science and technology, a considerable time lag is required before an innovation reaches wide acceptance (Rogers, 1962). Rogers identifies five stages in the process of adoption of an innovation: 1) awareness, 2) interest, 3) evaluation, 4) trial, and finally 5) adoption (1962). The US Department of Commerce gives examples of the time it has taken a critical innovation to reach 50 million users: radio took 38 years, personal computers 16 years, television 13 years, and the internet 4 years (Harden, 2005). Professionals today are operating at the beginning of a revolution, but the adoption of an innovation matters little on whether or not an innovation has an advantage over the idea it is replacing. What does matter is if the individual perceives the advantage of the innovation.

In order to effectively explore the use of distance education, as a means for Pennsylvania physical therapists to meet their requirements for continued education, it is

helpful to use Rogers' Diffusion of Innovations theory. This theory of innovations is one of the most researched and dominant models in the study of innovation adoption behavior (Demir, 2006), and it provides a framework for the motivation and willingness of physical therapists to use distance education for CPE. Rogers describes an innovation as an idea perceived as new by an individual or another unit of adoption (Rogers, 1962). The process by which an innovation spreads is referred to as diffusion (Rogers, 1962). Rogers' theory offers great detail on the diffusion process identifying four elements of diffusion: innovation, communication channels, time and the social system (Rogers, 1962).

The first element, *innovation*, involves an innovation-decision process that happens slowly over a period of time through a series of decisions and actions. Rogers describes this process as consisting of 5 stages: knowledge, persuasion, decision, implementation, and confirmation (Rogers, 2003).

1. Knowledge occurs when a potential adopter learns about the existence of the innovation and gains some understanding of its function.
2. Persuasion occurs when a potential adopter forms a favorable or unfavorable attitude toward the innovation.
3. Implementation occurs when an innovation is actually put to use.
4. Confirmation occurs when an adopter seeks reinforcement of an innovation-decision that has already been made, but the adopter may reverse this decision if exposed to conflicting messages about the innovation.

Communication channels, the second element of diffusion, is essential in the adoption of an innovation. This is the process by which the individual adopters obtain a mutual understanding through the sharing of information.

Time refers to the rate of adoption of an innovation. This is the speed at which the social system's members adopt an innovation. Rogers lists 5 characteristics that explain this timing: "relative advantage, compatibility, complexity, trialability, and observability" (Rogers, 2003, p.25).

1. Relative advantage is the degree to which an innovation is superior to ideas it supersedes and it could be emphasized by a crisis. An example of this was in 1951 when farmers in Wisconsin adopted grass silage instead of hay because of a climatic crisis.
2. Compatibility is the degree to which an innovation is consistent with existing values and past experiences of the adopters. If an idea is not compatible with the cultural norms of a social system, it will not be adopted so rapidly.
3. Complexity is the degree to which an innovation is relatively difficult to understand and use. The idea needs to be clear to the members of the social system.
4. Trialabilty is the degree to which the innovation may be trialed and modified. This stimulates peer discussion.

5. Observability is the degree to which the results of the innovation are visible to others in the social system. If respected clinicians argue for the application it is likely to have a positive impact.

Innovations that are perceived by social system members as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly (Rogers, 2003)

While there are differences among individual rates of adoption, there are also differences between the rates of adoption for the same innovation within social systems. This involves the last element of diffusion, *social system*. Rogers grouped adopters into five categories based on their degree of innovativeness: innovators, early adopters, early majority adopters, late majority adopters, and laggards (Rogers, 1962).

1. Innovators are venturesome and are eager to try new ideas. They are typically the youngest, most specialized, and wealthiest in the social system.
2. Early adopters are localities and have a great degree of opinion leadership in the social system. Potential adopters look to them for advice and information on the adoption. Early adopters have a high social status and are specialized.
3. Early majority adopters adopt the new idea just before the average member of the social system. These members do not generally hold leadership roles, but they make an important link for legitimizing innovations. They have an average sized social status.
4. Late majority adopters adopt new ideas just after the average member of a social system. They approach with caution and generally out of necessity of

some kind. Late majority adopters have a low social status, less specialization, and lower income.

5. Laggards are the last to adopt an innovation. The point of reference of the laggard is the past and the adoption process is a crawl. Laggards are the oldest in the social system, have the lowest level of specialization, lowest social status, and lowest income.

Continuing professional education is a crucial component to professional development as a physical therapist. Not only is it identified by the professional as a lifelong goal, the APTA defines it as a responsibility of the physical therapy professional, and it is also mandated by regulatory State Boards of Physical Therapy for licensure renewal. As contemporary practice develops and changes, physical therapists must continue their education to establish continued competence and meet required mandates for quality healthcare. Unfortunately with the demands of professional and personal life, physical therapists are expressing a need for more accessible CPE that allows flexibility and self-study.

Distance education is an emerging innovation as a means for physical therapists to obtain required CPE hours. A great deal of research has addressed the feasibility of distance education, the use of technology, and adult learning principles in formal educational settings, however there is a dearth of research available in the CPE environment (Birzer, 2004; Donavant, 2009b). The use of Rogers' theoretical framework to consider why a potential user may consider distance education for CPE allows for a

thorough exploration of the use of distance education by physical therapists in the state of Pennsylvania.

Summary

A review of the education and healthcare literature indicates the importance of continuing education activities as a means of professional development and re-licensure for physical therapists in the state of Pennsylvania. Physical therapists also express a need for accessible and flexible means to complete the CPE requirements. The use of distance education offers the potential to significantly reduce the discrepancies between learning opportunities and the CPE needs of physical therapists. However, to date there are no published studies that report the use and adoption of distance education for CPE in physical therapy or the perceptions of physical therapists to distance education for CPE. This information is needed to ensure that those who develop and deliver CPE are meeting the expectations and needs of physical therapists.

CHAPTER THREE

PROCEDURE

The purpose of this study was to collect information about the use of distance education by Physical Therapists in the state of Pennsylvania as to whether it meets their needs for mandated continuing professional education. This chapter describes the procedures that were used to address the following research questions.

1) How are physical therapists in Pennsylvania using distance education technologies to meet mandated continuing education requirements?

2) What characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapists' in Pennsylvania use of distance education to meet mandated continuing education requirements?

3) Which demographic characteristics such as age, educational level, living area, gender, area of expertise, or job position influence physical therapists' use of distance education to meet mandated continuing education requirements in Pennsylvania?

This chapter is divided into four parts: research design, survey instrument development, data collection procedure, and data analysis.

Research Design

For this study a questionnaire was utilized for data collection. Fink (2006, 1-10) describes four types of survey instruments as methods for collecting information from people to compare or explain their knowledge, attitudes and behavior. These include questionnaires, interviews, structured record reviews and structured observation. A questionnaire was selected for this study because it could be administered via the Intranet

anonymously to a large sample. This provided the benefit of having a better representation of the sample population and the ability to analyze the data statistically. The questionnaire was adopted from an existing questionnaire to specifically assess the use of distance education for continuing education by licensed physical therapists in Pennsylvania. Qualtrics was chosen as the enterprise platform for administering the survey via the Intranet because of its ability to provide an anonymous and convenient delivery followed by a streamlined feed of data into statistical analysis software.

The questionnaire adapted for use in this study was an instrument entitled, Tennessee Academy of Family Physicians Survey. It was originally developed by Deborah Hall Joyner and then was adapted by Bridget Piernik-Yoder for use in a study on the use of DE for CPE by allied health professionals in Texas (Piernik-Yoder, 2004). Permission to modify and administer the questionnaire was obtained from Deborah Hall Joyner, PhD and Bridgett Piernik-Yoder, PhD via email. The questionnaire was designed with the use of information from a review of literature about distance learning and continuing education trends and requirements.

Initial modifications to the Piernik-Yoder version of the questionnaire were made based on Piernik-Yoder (2004) recommendations from her study, information from the literature, and the need to tailor the instrument to this study population.

Below are the specific initial modifications made to the questionnaire:

1. Questions to investigate the specific demographics of the Pennsylvania physical therapist population (Q17, Q20, and Q21) were adapted and added.
2. Terminology was changed (Q4) to reflect the subjects in this study.

3. National organizations referred to (Q8) were changed to reflect national organizations of physical therapy professionals.
4. Numbering and organization of the survey was altered to suit an online administration through Qualtrics, because the original questionnaire was administered via regular mail.
5. The wording of question 14 (Q14) was changed from what is your "sex" to what is your gender to maintain professional presentation of the study.

The modified questionnaire included 20 questions, including five-point Likert scale closed ended, multiple choice, and fill in the blank questions. There was also an area for the study participants to comment. Table 1 below aligns the specific questionnaire questions to the research questions in this study.

Table 1

Questionnaire Questions Categorized by Research Question

Research Question Three: Which demographic characteristics such as age, educational level, living area, gender, area of expertise, or job position influence physical therapists' use of distance education to meet mandated continuing education requirements in Pennsylvania?	Demographic data was be correlated with the use of distance education for continuing education (CE).
Q12 Which of the following best describes the type of facility or institution in which you currently do all or most of your work (your primary position)?	
Q14 What is your gender?	
Q13 What is your highest academic degree?	
Q16 How would you characterize the community in which you work?	
Q15 What is your ethnicity?	

Q17 How would you describe your employment status and your primary work responsibilities?	
Q19 What is your age in years?	
Q20 How many years have you been a licensed physical therapist?	
Q21 Do you hold a license for direct access physical therapy in the state of Pennsylvania?	
Q8 Please indicate the provider of the CE activities that you attended through distance education (indicate as many as apply)	
Q18 Do you have (Circle as many as apply): 1 A computer at home? 2 Internet access at home? 3 Access to a computer at work to use for CE activities? 4 Internet access at work to use for CE activities?	Identifies computer and internet access for the survey and for use of many forms of distance education.
Research Question One: How are physical therapists in Pennsylvania using distance education technologies to meet mandated continuing education requirements?	
Q2 How many hours of continuing education activities have you participated in during the past 24 months? (If answer is "0", online survey skips ahead)	Identifies participation in continuing education activities.
Q3 How many of the hours indicated in question 2 (Q2) were completed through distance education (i.e. self study, audiotape, videotape, teleconferencing, CD-ROM, internet/web-based course)?	Identifies awareness of distance education activities.
Q4 How many hours of continuing education would you estimate that you have completed through distance education over the course of your career as a physical therapist professional? (If answer is "0", online survey skips ahead)	
Q5 Please indicate the frequency of your use of the following distance education technologies to meet your CE requirements over the past 24 months. 1_____2_____3_____4_____5 Never Rarely Sometimes Often Always	Identifies awareness of distance education activities.

____Print based technology ____Audiotape ____Videotape ____CD-ROM ____Audio conferencing ____Videoconferencing ____Internet/ World Wide Web	
Q9 and Q10 Please indicate the extent to which you disagree or agree with the following items. 1_____2_____3_____4_____5 Strongly Disagree Neutral Agree Strongly Disagree Agree The following factors influence my participation in CE activities provided through either distance education or traditional approaches: ___Quality ___Content ___Applicability of information ___Availability ___Convenience ___Reliability of the source ___Location close to work or home ___Cost ___Time away from work ___Time away from home ___ CE delivered through distance education costs more than traditional CE activities. ___CE delivered through distance education offers higher quality of instruction than traditional CE activities. ____CE delivered through distance education offers less interaction with the instructor than traditional CE activities. ___CE delivered through distance education offers less level of interaction with other participants than traditional CE activities. ____CE delivered through distance education offers more advantages than traditional CE activities. ___CE delivered through distance education is more compatible with	Identifies awareness of distance education activities.

my CE needs than traditional CE activities. ___CE delivered through distance education is more complex than traditional CE. ____CE delivered through distance education offers more opportunities to experiment without risk than traditional CE activities. ___ CE delivered through distance education results in more observable benefits than traditional CE activities.	
Q6 Please indicate your perceived ability to use the following distance education technologies to meet your continuing education requirements using the scale listed below. 1_____2_____3_____4_____5 None Low Moderate High Expert ___Print based technology ___Audiotape ___Videotape/DVD ___CD-ROM ___Audio conferencing ___Videoconferencing ___Internet/World Wide Web	Identifies awareness of distance education activities.
Q11 Please indicate the extent to which you disagree or agree with the following items. 1_____2_____3_____4_____5 Strongly Disagree Neutral Agree Strongly Disagree Agree __ I am aware of CE activities delivered through distance education. __ I am interested in using distance education to meet my CE requirements. __ I have access to the technology needed to participate in CE activities provided through distance education. ***__ I am comfortable with the technology used in CE activities provided through distance education. __I will use distance education to meet my CE requirements in the next 12 months.	Identifies awareness of distance education activities. ***Comfort with technology required to participate in distance education activities.
Research Question Two: What characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical	

therapists' in Pennsylvania use of distance education to meet mandated continuing education requirements?	
Q10 Please indicate the extent to which you disagree or agree with the following items. Continuing education offered through distance education….. 1_____2_____3_____4_____5 Strongly Disagree Neutral Agree Strongly Disagree Agree ___ costs more than traditional CE activities. ___ offers higher quality of instruction than traditional CE activities. ____ offers less interaction with the instructor than traditional CE activities. ___CE delivered through distance education offers a lower level of interaction with other participants than traditional CE activities ____ offers more advantages than traditional CE activities. ___ is more compatible with my CE needs than traditional CE activities. ___ is more complex than traditional CE. ____ offers more opportunities to experiment without risk than traditional CE activities. ___results in more observable benefits than traditional CE activities.	These questions provide the study participants' overall perception of distance education. Study participants' perception of distance education with regards to Rogers' Diffusion of Innovations characteristics was be assessed by responses to these five statements that are directly adapted from the five Diffusion of Innovations characteristics
Q7 Please indicate the extent to which you disagree or agree with the following items. 1_____2_____3_____4_____5 Strongly Disagree Neutral Agree Strongly Disagree Agree ___My overall experience using distance education to meet my CE requirements has been positive. ___I expect my future experience using distance education to meet	These questions provide the study participant's overall perception of distance education.

my CE requirements to be positive.	
Q11 Please indicate the extent to which you disagree or agree with the following items. 1_____2_____3_____4_____5 Strongly Disagree Neutral Agree Strongly Disagree Agree __ I am aware of CE activities delivered through distance education. __ I am interested in using distance education to meet my CE requirements. __ I have access to the technology needed to participate in CE activities provided through distance education. ***__ I am comfortable with the technology used in CE activities provided through distance education. __I will use distance education to meet my CE requirements in the next 12 months.	Directly aligns with Rogers five diffusion of innovations characteristics

Survey Instrument Development

The success of a self-administered questionnaire relies on clarity (Fink, 2006, p.6). If the language used in the questionnaire is not clear participants may not be able to follow the directions, may misunderstand the questions, or may get frustrated and fail to complete the survey. To establish clarity of language and content validity of the modified Piernik-Yoder version of the instrument, a pilot test was performed using a panel of 10 expert judges. The panel of experts included nine Pennsylvania licensed physical therapists and one professor with experience on a college institutional review board. Each individual was asked to provide feedback on the clarity of the cover letter and directions, ease of access via the website and Qualtrics portal, the clarity of the individual questions, and the submission procedures and instructions. The pilot group was instructed to answer the following questions as recommended by Fink (2003, p.109).

1. Are the instructions for completing the survey clearly written?

2. Are the questions easy to understand?

3. Do respondents know how to indicate responses?

4. Are the response choices mutually exclusive?

5. Are the response choices exhaustive?

6. Can the respondents correctly use the commands of the web-based survey?

7. Do respondents know how to change their answers?

8. Is the privacy of the respondents respected and protected?

9. Do you have any suggestion regarding the addition or deletion of questions, clarification of instructions, or improvements in questionnaire format?

The panel of experts made several suggestions. The first was to provide definitions at the start of the survey to assist in clarifying the questions. In response to this request, distance education or course, traditional education or course were both defined at the start of the questionnaire. Another suggestion was to make the instructions for changing the page of the survey more clear. One expert stated that she did not understand how to move backward in the survey to see prior questions. In response to this request additional cues were provided at the bottom of each page of the questionnaire to move forward or backward by page.

The majority of the questions in this survey were descriptive in nature and therefore reliability could not be assessed. Three of the questions (9, 10 and 11) used a block of likert scale statements that assessed overall perceptions and attitudes of the subjects. Reliability could be assessed on these questions following data collection using

using the Cronbach's alpha. Cronbach's alpha is a powerful tool for measuring internal consistency in questions where there are three or more responses as in a Likert scale.

Data Collection Procedure

Sample Size and Sampling Procedure

Adequate sample size ensures better internal validity. The larger the sample size, the less risk of a type I error, where the researcher rejects the null hypothesis when it is actually true. There are several methods available to determine the adequate sample size. The Coalition for Evidence Based Policy (2003) recommends a minimum sample size of 150 subjects in an effort to provide effective results. Alrech and Settle (2004) recommend using 10% of the total population as an approximate goal. One hundred participants is the recommended minimum for a confidence interval of 17% and 300 participants is the recommended minimum for a confidence interval of less than 10%. For the latter, this would mean that there is a 95% probability that the population mean will be within 10 percent of the sample mean with 300 participants. Krejcie and Morgan (1970) require that the sample size be representative of the total population. The Commonwealth of Pennsylvania reports as of July of 2013 that there are 12,857 licensed physical therapists in the state of Pennsylvania. Using this total number, Krejcie and Morgan (1970) would suggest a sample size of 306 for a confidence level of 95% and a margin of error of +/-5 %.

The population for this study consisted of a convenience sample of physical therapists licensed in the state of Pennsylvania. A list of 2047 PA licensed physical therapists was created from volunteer attendees of the Pennsylvania Physical Therapy

Association state conference who provided their email addresses and from a web listing of emails of Pennsylvania physical therapists. Inclusion criteria were based only on possessing a current license as a physical therapist in the state of Pennsylvania and an email address.

Data Collection

To access and complete the questionnaire for this study, subjects needed to use a computer or tablet and the Internet. The 2004 Nielsen report on internet access of Americans reported that 3 out of every 4 Americans has access to the internet, 75% of those from home. This was a 9% increase from the report done just one year earlier in 2003 (Nielsen/Net Ratings, 2004). A follow up study in 2008 revealed that 80.6% of homes in Nielsen's National People Meter panel have a computer in their homes and 96% of these homes have some type of Internet connection (Anonymous, 2008). The 2008 report also stated that access to the Internet increased with a higher level of education and a higher income (Anonymous, 2008). Considering the above information, an email notification/web questionnaire delivery combination was deemed appropriate as a medium for administering this study.

Several recommendations are made in the literature to increase response rates for an online questionnaire including, follow up emailing, use of anonymous surveys, use of graphically sophisticated surveys and monetary incentives (Fink, 2003). This study included a follow-up emailing with a reminder two weeks following the initial email invitation, incorporated a professional and graphically sophisticated survey medium

called Qualtrics, and administered an anonymous survey with no way to link the responses to the individual subjects.

An introductory paragraph and invitation to access the survey with IUP letterhead was sent to each of 2047 subjects via email using an e-blast medium called Constant Contact on June 28, 2013. The email included an anonymous link to the survey that was created in Qualtrics. This email was opened by 708 of the 2047 subjects. There were 330 bounces and 6 opt outs with an open rate of 41.2%. On July 12, 2013 a follow up email was sent to 2041 subjects (the original list less the 6 who opted out in the first email blast) with a reminder letter on IUP letterhead. 331 of these emails bounced, 4 more subjects opted out, and 251 opened the email. The survey closed with a final total of 361 completed surveys.

Data Analysis

Data collected in Qualtrics was analyzed using the Statistical Package for Social Sciences (SPSS) using descriptive statistics, specifically frequencies, percentages, means and standard deviations, one-way ANOVA with post-hoc testing as necessary, and correlation. Reliability was assessed following data collection on applicable questions (9, 10 and 11) using Chronbach's alpha. Qualitative data in the comments area of the survey was analyzed using a constant comparative method as described by Merriam (1998).

Summary

This study examined the characteristics and factors that influence Pennsylvania physical therapists to obtain mandated continuing education through the use of distance

education. Survey design utilizing an online questionnaire and sample of convenience of 2047 Pennsylvania physical therapists was performed to identify characteristics leading to the use of continuing education through distance education. Data were analyzed using descriptive statistics, specifically frequencies, percentages, means and standard deviations, one-way ANOVA with post-hoc testing as necessary, and correlation. Qualitative data in the comments area of the survey was analyzed using a constant comparative method as described by Merriam (1998).

CHAPTER FOUR

DATA AND ANALYSIS

Introduction

This chapter will describe the quantitative data collected through the online questionnaire. The purpose of this study is to collect information about the use of distance education by physical therapists in the state of Pennsylvania to meet their needs for mandated continuing professional education. This was accomplished using a questionnaire that included questions investigating Rogers' Diffusion of Innovation Theories and demographic information. The questionnaire was a modified version of a survey designed previously for healthcare professionals in Texas. The theoretical framework for this study is based on Rogers' Theories of Innovation.

Demographics and responses of the participants were analyzed as they relate to the three research questions.

1) How are physical therapists in Pennsylvania using distance education technologies to meet mandated continuing education requirements?

2) What characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapists' in Pennsylvania use of distance education to meet mandated continuing education requirements?

3) Which demographic characteristics such as age, educational level, living area, gender, area of expertise, or job position influence physical therapists' use of distance education to meet mandated continuing education requirements in Pennsylvania?

Descriptive statistics and analysis of variance with post hoc analysis were used to assess all of the research questions. A comparative method was used to evaluate the qualitative comment section of the survey.

Description of Sample Data

A total of 2047 introductory emails were sent via email to a convenience sample of licensed physical therapists in Pennsylvania. 708 of these emails were opened, 330 bounced, and 6 subjects opted out. A follow up introductory email was sent two weeks later to 2041 subjects (2047 original subjects less the 6 who opted out). On this attempt, 251 emails were opened, 331 bounced, and 4 subjects opted out. This resulted in 361 completed surveys.

APTA Demographics Comparison

Demographic data collected in the survey were analyzed and presented in order to describe the study sample and to demonstrate that the sample was similar in several aspects to the most recent demographics of the members of the American Physical Therapy Association (APTA) reported in 2010. The similarity of the sample to these demographics supports that the sample is representative of the national population of physical therapists. Table 2 indicates that the gender distribution and years of practice were similar to the APTA demographics with a larger group of females (52.9%) and a high level of practice experience averaging 20.9 years. Age, nationality, and employment status were also similar. The ages in this study ranged from 25 years to 72 years with a mean age of 47.4 which is within five years of the APTA demographic

mean. In both the study demographics and the APTA demographics the largest groups were white in the nationality (96.4% of subjects) and full time salaried in the employment status (54.8% of subjects). The most common practice setting was outpatient (43.7% of subjects) in both demographics with hospital based (24.9% of subjects) falling second.

Table 2

Demographic Comparison to APTA Members

Demographic Factor	Frequency	This Study Demographics	2010 APTA Demographics
Gender	Male	46.5 %	31.7%
	Female	52.9%	68.3%
Age	Mean	47.4	43.5
Years of Practice	Mean	20.9	17.9
Practice Setting	Outpatient	43.7%	33.6%
	Hospital Based	24.9%	20.9%
Employment Status	Full Time Salaried	54.8%	57.9%
Nationality	White	96.4%	92.7%

Table 3

Detailed age Category Comparison to APTA Demographics

Age Category	Valid Percent This Study (7 did not answer the question)	Percent APTA Demographics 2010
20-24	0	.8
25-29	8.5	13.4
30-34	16.7	13.2
35-39	16.1	12.8
40-44	9.9	12.8
45-49	12.4	12.6
50-54	12.1	13.4
55-59	13.8	12.1
60-64	8.2	6.5
65+	2.3	2.3

Table 4

Detailed Years in Practice Comparison to APTA Demographics

Years in Practice	Valid Percent this Study	Percent APTA Demographics
<1	7.7	5.0
1-3	.7	9.9
4-5	6.0	5.3
6-10	20.5	13.4
11-15	20.8	14.0
16-20	12.4	11.9
21-30	25.5	21.6
31+	6.4	18.9

The break down for the highest academic degree is listed in table 5. The most noticeable difference in the two groups' demographic percentages would be the smaller number of subjects with the baccalaureate degree. This is most likely due to the age of the APTA data. The baccalaureate degree in physical therapy has been completely phased out as of 2012, and as a result there are less and less physical therapists with this degree. There were also a higher percentage of subjects with the tDPT, and this is also most likely due to the age of the APTA demographic data. The tDPT is becoming a popular option for physical therapists in practice to advance their degree, and this is reflected in the increased percentage in the sample for this study.

Table 5

Highest Earned Degree Comparison to APTA Demographics

Highest Degree Attained	This Study Percent	APTA 2010 Demographics Percent
Baccalaureate Degree	12.1	24.7
Master's Degree	26.8	32.0
PhD	4.9	5.8
DPT	29.6	20.7
tDPT	24.0	13.8
Other	2.2	2.9

Additional demographic information was gathered that was not in the APTA demographics to assist with this study. This is reported in Table 6 and includes, direct access status, community of employment, computer access and Internet access.

Direct Access Status

The direct access license for physical therapists is an advanced license that permits consumers to access physical therapy without a doctor's prescription. A physical therapist with a direct access license is required to complete additional continuing education every 24 months. This may have influenced the responses to the questions in the survey. Five of the subjects left the direct access question blank. It is possible that they did not know what this credential is. 201 of the 357 subjects who answered this question indicated that they have a direct access license.

Community Size

The community of employment is of interest because it is important to understand if rurally located physical therapists have a greater need or desire for distance education.

The three community categories used in the questionnaire were metropolitan (population 150,000+), urban (75,000 to 149,999) and rural (less than 30,000) and the largest group was urban with 147 subjects. There were 110 rural subjects were rural and 104 metropolitan.

Computer and Internet Access

Lastly computer and/or Internet access could influence the ability for a subject to access and complete the questionnaire used for this study or to perform some forms of distance education. This category demonstrated good results for both the ability to complete the survey and the ability to access distance education as 360 subjects responded that they have a computer at home and 355 responded that they have Internet access at home.

Table 6

Demographic Factor and Number of Subjects in Study

Demographic Factor	Response	# of Subjects This Study
Direct Access Status	Yes	201
	No	156
Community	Metropolitan	104
	Urban	147
	Rural	110
Access to Computer	Home	360
	Work	307
Access to Internet	Home	355
	Work	304

Analysis of the Use of Distance Education

Research question number one asked how Pennsylvania physical therapists are using distance education technology to meet their mandated continuing education requirements. In order to provide a context for this research question, the subjects were asked to communicate their use of DE to meet CE requirements including the use of DE in the last 24 months, as well as the total use of DE in throughout their career. Subjects were asked to provide information on factors that influence their a) participation in CE activities, b) access to technology, and c) comfort with the technology. The subjects were also asked questions about their use of DE that related to delivery method and provider type.

Participation in Distance Education

The questionnaire collected data to answer this research question with survey question number 2 which asked how many hours of continuing education were completed over the last twenty-four months. Twenty-four months is the period for licensure renewal so this is a good indicator of the average amount of continuing education completed. Descriptive statistics revealed that the range of continuing education hours reported in the last 24 months by the subjects was between 0 and 360 hours with a mean of 44.85 hours and a mode of 46 hours. Then, question number 3 asked how many of those hours were completed through distance education. Descriptive statistics revealed that 42.4% of the subjects responded that they did not perform any of their continuing education through distance education. Of those that reported some hours by distance education the range

was 0 to 330 hours and an average total of distance education per person over a two-year period was 12.25 hours. Descriptive statistics on question two and three revealed that 57.6% of the 361 subjects used distance education of some kind for the completion of their continuing education requirements within the last twenty-four months and that the average use was 12.25 hours per person. Question 4 asked how many hours of continuing education were completed through distance education throughout their career. Eighty-two point eight percent of the subjects reported that they had done some CE through distance education in their career and the range was between 0 and 1500 hours with a mean of 67.66 hours.

Access to Technology

Computer and/or Internet access could influence the ability for a subject to use DE for CE. Subjects were asked for their access to computer and/or Internet from both home and work in question 18 parts 1, 2, 3 and 4. They were permitted to mark all responses that applied. 360 subjects responded that they have a computer at home and 355 responded that they have Internet access at home. Three hundred and seven reported that they have access to a computer at work for use in CE activities and 304 reported Internet access at work to use for CE activities. Three hundred and sixty of the 361 subjects have access to technology needed to complete distance education.

Table 7

Access to Technology

"Mark all that Apply"	N	Minimum	Maximum	Mean	Std. Deviation
Computer at Home	359	1	1	1.0	.000
Internet Access at Home	354	1	1	1.0	.000
Access to Computer at Work	306	1	1	1.0	.000
Internet Access to Use for CE at Work	303	1	1	1.0	.000
Valid N	295				

Question 11 part three asked a Likert scale question where the subjects indicated their agreement or lack of agreement on having access to the technology needed to participate in CE activities provided through DE. The mean response to this question was 4.30, indicating that subjects Agree that they have access to the technology needed to participate in CE through DE.

Comfort With Technology

Question 11, part four asked a Likert scale question where the subjects indicated if their agreement or lack of agreement with being comfortable with the technology used in CE provided through DE. The mean response to this question was 4.09, which would indicate that the subjects agreed that they were comfortable with the technology used in CE provided through DE. The subjects who had indicated that they took DE in the last

24 months had a slightly higher mean score of 4.12 and those who had not taken DE in the last 24 months had a slightly lower mean score of 3.92.

Delivery Method

Subjects were asked in question number 5 for their frequency of use of different types of distance education including print based, audiotape, videotape, CD ROM, audio conferencing, video conferencing and Internet. Statistical analysis demonstrated that the most frequently used types of distance education were print based and Internet, with 31.5% of the subjects responding that they use print based distance education either often or always and 37.7% of the subjects responding that they use Internet based distance education either often or always. The most rarely used types of distance education were audiotape and videotape, with 88.2% of the subjects reporting that they rarely or never use audiotape and 79.9% of the subjects reporting that they rarely or never use videotape. See table 8 below.

Table 8

Type of Distance Education Used

Use of	Print Based (mean)	Audiotape (mean)	Videotape (mean)	CD ROM (mean)	Audio Conf. (mean)	Video Conf. (mean)	Internet/ WWW (mean)
Never	15.6	74.8	61.1	43.2	45.0	45.7	12.6
Rarely	19.4	16.4	18.8	23.3	20.1	19.4	14.3
Sometimes	33.6	7.7	14.9	25.4	27.7	25.6	35.4
Often	23.2	1.0	4.2	7.0	5.9	7.6	28.9
Always	8.3	0	1.0	1.0	1.4	1.7	8.8

Provider Type

Question 8 asked subjects to indicate who the providers of the DE CE activities were. They were instructed to indicate as many as apply when choosing the following: your employer, a national professional organization, a university or a private provider. The national professional organization was the most frequent provider and a university was the least frequent.

Table 9

Provider of Continuing Education Through Distance Education

Provider	Number of subjects
Employer	99
National professional organization	222
University	78
Private provider	196

Analysis of Characteristics

Research question 2 asked what characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapist's use of DE to meet mandated continuing education requirements. This question provides the framework for the motivation and willingness of physical therapists in Pennsylvania to use distance education for continuing professional education.

Rogers Innovator Categories

Rogers grouped adopters of innovations into five categories based on their degree of innovativeness ("Innovators, Early Adopters, Early Majority Adopters, Late Majority Adopters, and Laggards") (Rogers, 1962, p. 25). Each of these five categories had defining characteristics. The *innovators* are eager to try new ideas and they are characteristically the youngest, most specialized, and wealthiest in the social system. To assess Rogers' theory age, highest earned degree, and direct access license were correlated to question 3 that indicated the number of hours of distance education performed in the last two years using one-way ANOVA. There was no significance to age ($p < .961$), highest earned degree ($p < .933$), or direct access license ($p < .198$). The highest earned degree and direct access license could indicate a higher level of specialization in the field. Income was not assessed in this survey, so a measure of wealth was not available for analysis. The data revealed that the highest mean hours of DE in the last 24 months was 14.03 hours for those in the 30-34 age group, 14.87 hours for those in the tDPT group, and 14.34 for those with a direct access license. These results for DE use in the past 24 months for the youngest or the highest degree attained did not agree with Rogers' theories. However, if possessing a direct access license were considered as a measure of more experience in the field, this factor would fit with Rogers' theory that those with more experience would be first to adopt a new innovation.

Table 10

Distance Education Hours Completed According to age Group

Age Range	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
25-29	30	12.55	37.546	6.855	-1.47	26.57
30-34	59	14.03	44.993	5.858	2.30	25.75
35-39	57	17.03	46.529	6.163	4.68	29.37
40-44	35	12.67	24.167	4.085	4.37	20.97
45-49	44	10.31	18.305	2.760	4.74	15.87
50-54	43	11.51	19.507	2.975	5.51	17.52
55-59	49	10.47	12.540	1.791	6.87	14.07
60-64	29	7.48	12.654	2.350	2.67	12.30
65+	8	13.63	23.207	8.205	-5.78	33.03
Total	354	12.44	31.402	1.669	9.16	15.73

Age Range	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2500.934	8	312.617	.312	.961
Within Groups	345581.241	345	1001.685		
Total	348082.176	353			

Table 11

Distance Education Hours Completed According to Highest Degree

Highest Degree Attained	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Baccalaureate degree	44	11.09	14.805	2.232	6.59	15.59
Master's degree	96	10.33	20.245	2.066	6.23	14.43
PhD	18	9.00	22.919	5.402	-2.40	20.40
DPT	107	13.26	38.418	3.714	5.89	20.62
tDPT	86	14.87	39.471	4.256	6.40	23.33
Other	8	12.13	12.182	4.307	1.94	22.31
Total	359	12.36	31.201	1.647	9.12	15.59

Highest Degree Attained	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1297.148	5	259.430	.264	.933
Within Groups	347207.820	353	983.592		
Total	348504.968	358			

Table 12

Distance Education Completed According to Direct Access License

Direct Access License	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Yes	200	14.34	37.312	2.638	9.14	19.54
No	155	10.02	21.237	1.706	6.65	13.39
Total	355	12.45	31.360	1.664	9.18	15.73

Direct Access License	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1632.596	1	1632.596	1.663	.198
Within Groups	346504.090	353	981.598		
Total	348136.686	354			

An additional correlation was assessed for innovators with the idea that youngest in the field might be a better measure of Rogers' description of innovators as being "young". A one-way ANOVA was done on the number of hours completed through distance education, and the number of years as a licensed physical therapist. Again the results showed no significance ($p < .963$). The data indicated that physical therapists with 11-15 years of practice had completed the highest number of DE continuing education credits in the last 24 months with a mean of 15.49 hours. The lowest number of hours was in the 21-30 years of practice group with a mean of 9.10 hours. Since this

was not a low number for years of practice, these results did not agree with Rogers' theory on innovators.

Table 13

Use of Distance Education and Years of Practice

Years in Practice	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
<1	23	9.67	31.077	6.480	-3.76	23.11
1-3	2	3.50	4.950	3.500	-40.97	47.97
4-5	18	14.06	36.745	8.661	-4.22	32.33
6-10	61	14.02	43.755	5.602	2.82	25.23
11-15	62	15.49	45.266	5.749	4.00	26.99
16-20	37	14.93	23.497	3.863	7.10	22.77
21-30	76	9.10	15.979	1.833	5.45	12.75
31+	19	12.58	13.914	3.192	5.87	19.29
Total	298	12.69	33.271	1.927	8.90	16.48

Years in Practice	Sum of Squares	df	Mean Square	F	Sig
Between Groups	2173.607	7	310.515	.276	.963
Within Groups	326594.930	290	1126.189		
Total	328768.538	297			

Rogers' *early adopters* have a great deal of opinion leadership in the social system and potential adopters look to them for advice. These early adopters are generally wealthy and specialized. Again, there was no question on income in the survey, so this could not be assessed and the measures for specialization reported in tables 11 and 12 were not significant. Opinion leaders in physical therapy could be the administrators and managers so this information from question number 17 was correlated with the number of

hours of distance education completed and analyzed with one-way ANOVA. No significance was found ($p < .832$). The highest mean use of DE was in managers who worked part time at 16.67 hours and the lowest was in full time managers, so this theory did not apply with these subjects.

Table 14

Position of Employment and use of Distance Education

Position of Employment	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Full –time employee, direct patient care	198	13.43	32.439	2.305	8.88	17.97
Part-time employee, direct patient care	31	9.27	14.750	2.649	3.86	14.68
Full –time employee, management/administration	53	8.51	15.194	2.087	4.32	12.70
Part –time employee, management/administration	6	16.67	22.509	9.189	-6.96	40.29
Other	70	12.98	41.421	4.951	3.10	22.86
Total	358	12.31	31.230	1.651	9.06	15.55

Position of Employment	Sum of Squares	df	Mean Square	F	Sig
Between Groups	1443.354	4	360.838	.367	.832
Within Groups	346749.404	353	982.293		
Total	348192.758	357			

Early majority adopters adopt a new idea just before the average member of the social system. These members are not generally leaders, but they make an important link for legitimizing innovations. In this study the mean use of distance education for non-leaders was assessed by job position looking to those who were not in management or

administration positions. DE usage in this group was average with a mean of 13.43 hours in the last 24 months. See table 14.

Late majority adopters adopt new ideas just after the average member of a social system. They have low social status, less specialization and lower income. In this study the measure of direct access used for a measure of specialization did show less use of DE for this group with a mean of 10.02.

Laggards are the last to adopt a new innovation. Laggards are the oldest in the social system, have the lowest level of specialization, lowest social status and lowest income. In this study the oldest subjects were 65 years or older with a mean DE use of 13.63, the longest in practice were 31 years or more with a mean of 12.58 and neither of these were the lowest mean scores for the groupings. See tables 10 and 13.

Rogers Innovation-Decision Process

Rogers' theory describes the diffusion of an innovation through a process of identifying four elements: innovation, communication channels, time, and the social system. The first element, *innovation*, is described by assessing the innovation-decision process that involves a series of decisions and actions. Rogers describes this process as consisting of five stages: knowledge, persuasion, decision implementation, and confirmation.

The first stage, *knowledge*, occurs when a potential adopter learns about the existence of the innovation and gains some understanding of its function. The first line of Question number 11 asked subjects if they were aware of continuing education (CE) activities delivered through distance education. The responses to this question were

analyzed via one way ANOVA and chi square non parametric analysis, with a significance of $p < .000$. Eighty eight point six percent of the subjects agreed or strongly agreed with the statement in the question indicating that physical therapists in the state of Pennsylvania have knowledge of the existence of continuing education offered via distance education. See table 15.

Table 15

Awareness of Distance Education Percentage of Respondents

Aware of CE through DE	Percentage of respondents	Observed N	Expected N	Residual
Strongly disagree	.6	2	71.8	-69.8
Disagree	5.3	19	71.8	-52.8
Neither agree nor disagree	5.6	20	71.8	-51.8
Agree	58.5	210	71.8	138.2
Strongly agree	30.1	108	71.8	36.2

	I am aware of CE activities delivered through DE
Chi-square Df Asymp. Sig.	428.312 4 .000

The second stage of Rogers' innovation decision process, *persuasion*, occurs when a potential adopter forms a favorable or unfavorable attitude toward the innovation. Question 10 asked several questions to address the attitudes of the subjects toward distance education. This is summarized in tables 16 and 17 with discrimination between those who had experienced distance education and those who had never experienced any

distance education. Responses given to the more positive questions were significantly different between the two groups, where responses to the more negative questions were not significantly different. This demonstrates that experience in distance education does influence the attitude of the subject toward distance education.

Table 16

Impression of Distance Education, Unfavorable Questions

Line of Question 10 Unfavorable Questions	Mean Response	Mean Response those who did not take DE	Significance
DE costs more than traditional CE activities	2.27	2.17	.190
DE offers a lower level of interaction with the instructor than traditional CE activities	4.01	4.01	.967
DE offers a lower level of interaction with other participants than traditional CE activities	4.05	4.05	.985
DE is more complex than traditional CE activities	2.59	2.62	.714

Table 17

Impression of Distance Education, Favorable Questions

Line of Question 10 Favorable Questions	Mean Response of those who took DE	Mean Response of those who did not take DE	Significance
DE offers a higher quality of instruction than traditional CE activities	2.36	2.64	.000
DE offers more advantages than traditional CE activities	2.57	2.98	.000
DE is more compatible with my CE needs than traditional activities	2.74	3.28	.000
DE offers more opportunities to experiment without risk than traditional CE activities	2.83	3.06	.007
DE results in more observable benefits than transitional CE activities	2.44	2.78	.000

The third stage, *decision implementation*, occurs when the innovation is actually put to use. Question 9 asked ten questions on factors that influenced the subject's decision to participate in continuing education either through distance education or traditional education. Since Question 9 was a grouping of ten Likert questions used to measure decision-making process, reliability could be measured through by Cronbach's

Alpha. Question 9 was found reliable (alpha=.825). The Likert responses in question 9 were evaluated for their non-parametric significance with the Friedman's Two-Way Analysis of Variance by Ranks for related samples. The significance was .000 with a decision to reject the null hypothesis. The results showed a significant difference in the responses indicating that the most important factors affecting a decision on a continuing education course either distance or traditional are the content, quality and the applicability of the information in that order. The factors that affected the decision the least were time away from work and time away from home. The factors were the same for both the group that had and the group that had not experienced DE in the last 24 months.

Table 18

Factors Influencing Decision-Making

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
						Lower Bound	Upper Bound
Quality	NoDE	152	4.47	.837	.068	4.34	4.61
	DE	206	4.61	.596	.042	4.53	4.69
	Total	358	4.55	.711	.038	4.48	4.63
Content	NoDE	152	4.58	.810	.066	4.45	4.71
	DE	207	4.71	.503	.035	4.65	4.78
	Total	359	4.66	.653	.034	4.59	4.73
Applicability of Information	NoDE	152	4.49	.814	.066	4.36	4.62
	DE	206	4.62	.562	.039	4.54	4.69
	Total	358	4.56	.682	.036	4.49	4.63
Availability	NoDE	151	4.20	.808	.066	4.07	4.33
	DE	206	4.41	.669	.047	4.32	4.50
	Total	357	4.32	.737	.039	4.24	4.40
Convenience	NoDE	152	4.18	.847	.069	4.04	4.31
	DE	207	4.38	.727	.051	4.28	4.48
	Total	359	4.30	.785	.041	4.21	4.38
Reliability of the Source	NoDE	151	4.40	.817	.066	4.27	4.53
	DE	206	4.55	.580	.040	4.47	4.63
	Total	357	4.49	.693	.037	4.42	4.56
Location close to work/home	NoDE	152	3.76	.970	.079	3.60	3.91
	DE	206	3.94	.946	.066	3.81	4.07
	Total	358	3.86	.959	.051	3.76	3.96
Cost	NoDE	151	3.83	.912	.074	3.69	3.98
	DE	207	4.11	.829	.058	3.99	4.22
	Total	358	3.99	.874	.046	3.90	4.08
Time away from work	NoDE	152	3.64	1.082	.088	3.47	3.82
	DE	207	4.00	.892	.062	3.88	4.12
	Total	359	3.85	.991	.052	3.75	3.95
Time away from home	NoDE	152	3.67	1.066	.086	3.50	3.84
	DE	205	4.04	.997	.070	3.91	4.18
	Total	357	3.89	1.042	.055	3.78	3.99

Table 19

Significance of Experience in Distance Education to Factors Influencing Decision Process

		Sums of Squares	df	Mean Square	F	Sig.
Quality	Between Groups	1.665	1	1.665	3.314	.070
	Within Groups	178.827	356	.502		
	Total	180.492	357			
Content	Between Groups	1.622	1	1.622	3.828	.051
	Within Groups	151.236	357	.424		
	Total	152.858	358			
Applicability of Information	Between Groups	1.470	1	1.470	3.179	.075
	Within Groups	164.678	356	.463		
	Total	166.148	357			
Availability	Between Groups	3.809	1	3.809	7.125	.008
	Within Groups	189.787	355	.535		
	Total	193.597	356			
Convenience	Between Groups	3.648	1	3.648	6.000	.015
	Within Groups	217.054	357	.608		
	Total	220.702	358			
Reliability of the Source	Between Groups	2.122	1	2.122	4. 455	.035
	Within Groups	169.072	355	.476		
	Total	179.193	356			
Location close to work/home	Between Groups	2.999	1	2.999	3.282	.071
	Within Groups	325.294	356	.914		
	Total	328.293	357			
Cost	Between Groups	6.452	1	6.452	8.618	.004

	Within Groups	266.523	356	.749		
	Total	272.975	357			
Time away from work	Between Groups	11.062	1	11.062	11.587	.001
	Within Groups	340.816	357	.955		
	Total	351.877	358			
Time away from home	Between Groups	12.134	1	12.134	11.513	.001
	Within Groups	374.158	355	1.054		
	Total	386.291	356			

The fourth and final stage of the innovation-decision process described by Rogers' is *confirmation*. This occurs when the adopter seeks reinforcement of an innovation-decision that has already been made. The adopter may reverse the decision if conflicting messages about the innovation are experienced. To assess confirmation the questionnaire asked question number 7, consisting of two Likert scale questions, which asked about the overall experience of using distance education to meet continuing education requirements and their expectation for the innovation-decision in the future. Question 7 was found to have internal consistency using Cronbach's alpha with a reliability of alpha=.911. This question was asked only to those who had indicated that they had taken distance education (201 of the 361 subjects). A simple T-test revealed that the mean answer to both questions was that the participants found that their overall experience with distance education was positive and that they predicted that their overall experience with future distance education would be positive. Both Friedman's two way

ANOVA by ranks and Kendall's Coefficient of Concordance for same samples indicated to reject the null hypothesis with a significance of .000.

Table 20

Overall Experiences With Distance Education and Prediction on Future use

	N	Mean	Std. Deviation	Std. Error Mean
Q7-1	201	4.05	.726	.042
Q7-2	201	3.95	.772	.045

	t	df	Sig.(2-tailed)	Mean Difference	95% Confidence interval of the difference	
					Lower	Upper
Q7-1	87.908	294	.000	3.953	3.86	4.04
Q7-2	95.861	294	.000	4.054	3.97	4.14

In summary, the responses to the questions pertaining to Rogers' innovation-decision process reveals that 88.6% of the subjects are aware of distance education available for continuing education to meet mandated requirements, the most critical factors in deciding on continuing education are content, quality, and the applicability of information, 57.6% of the subjects are actively using distance education to meet continuing education requirements, and those using distance education confirm that their distance education experience was positive and will be positive in the future.

The second element of Rogers' Diffusion of Innovation Theory is *Communication Channels*. This is the process by which the adopters obtain a mutual understanding of the innovation through the sharing of information. The questionnaire attempted to determine this by asking question number 8 where the subject indicated the provider of the

continuing education activities through distance education. Through the answers to this question, the method of information sharing is revealed. The results of question 8 are in table 21 below. Subjects were to select as many as applied. As you can see the most common sharing of information came from national organizations. Thus physical therapists are influenced most by their peers and by the attitudes of their national organization.

Table 21

Provider of Distance Education

Provider of Distance Education	Number of Subjects
Employer	99
National Professional Organization	222
University	78
Private Provider	196

The third element of Rogers' Diffusion of Innovations Theory is *time*. This refers to the rate of adoption of an innovation. This is the speed at which the Pennsylvania physical therapists adopt distance education for continuing professional education. Rogers lists five characteristics that explain this timing.

The first is *relative advantage*. This is the degree to which an innovation is superior to ideas that it will supersede. In this case distance education for continuing education would supersede traditional forms of continuing education. The questionnaire used likert scale questions within question number 10 to assess if the subjects felt that distance education, as continuing education was superior to traditional education. There were nine parts to question 10 that sought to discover the subject's overall opinion on

how distance education compared to traditional education. Parts 1,3,4, and 7 were statements that portrayed distance education as less superior and parts 2,5,6,8, and 9 were statements that portrayed distance education as more superior. To analyze this data the Likert responses for the negative parts (1,3, 4, and 7) were reversed and then all responses to question 10 were analyzed in independent samples T-tests and the Mann-Whitney U test comparing the responses of those who reported that they had experienced distance education in the last 24 months to those who had not. These statistical tests resulted in the same findings where both of the groups agreed with the positive statements on distance education, demonstrating that physical therapist attitudes toward distance education were consistent in physical therapists that had and had not experienced distance education in the last 24 months. The results for the positive parts of question 10 were all significant (.000 to .006) indicating to reject the null hypothesis. The results for the negative parts of question 10 were not significant.

Because question 10 was a grouping of questions measuring attitude, reliability could be assessed using Chronbach's Alpha. There were nine individual questions within question 10 and all but two were found to be reliable. Questions 10- 1R and 10-7R within question block 10 were not reliable, however the question demonstrated reliability with these factors removed (Cronbach's Alpha of .758). To gain a combined factor of the overall attitude that subjects had on the superiority of DE to traditional education or relative advantage, the results of all parts of Q10-1R, Q10-2, Q10-3R, Q10-4R, Q10-5, Q10-6, Q10-7R, Q10-8, and Q10-9 were combined into one variable named RA. The mean of RA was 2.79. This would indicate that physical therapists in the state of

Pennsylvania are undecided on if DE is superior to traditional education for continuing education.

Table 22

Reliability Item Statistics Question 10

Portion of Q10	Mean	Std. Deviation	N
Q10-2	2.5141	.72282	354
Q10-3R	1.9831	.82093	354
Q10-4R	1.9492	.81953	354
Q10-5	2.8107	.80775	354
Q10-6	3.0565	.96228	354
Q10-8	2.9633	.81509	354
Q10-9	2.6271	.74282	354

Table 23

Mann-Whitney U Test Relative Advantage

	Sig.	Decision
Q10-1R	.050	Retain Null Hyp.
Q10-2	.001	Reject Null Hyp.
Q10-3R	.627	Retain Null Hyp.
Q10-4R	.839	Retain Null Hyp.
Q10-5	.000	Reject Null Hyp.
Q10-6	.000	Reject Null Hyp.
Q10-7R	.972	Retain Null Hyp.
Q10-8	.006	Reject Null Hyp.
Q10-9	.000	Reject Null Hyp.

Table 24

Descriptives for Relative Advantage Comparing Those who had and had not Experienced Distance Education in the Last Twenty-Four Months

		N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean	
						Lower bound	Upper bound
Q10-1R	NoDE	151	3.73	.663	.053	3.62	3.84
	DE	208	3.83	.784	.054	3.72	3.94
	total	359	3.79	.736	.039	3.71	3.86
Q10-2	NoDE	151	2.36	.751	.061	2.24	2.48
	DE	208	2.64	.695	.048	2.54	2.73
	total	359	2.52	.732	.039	2.44	2.60
Q10-3R	NoDE	151	1.99	.894	.073	1.84	2.13
	DE	208	1.99	.768	.053	1.88	2.09
	total	359	1.99	.822	.043	1.90	2.07
Q10-4R	NoDE	150	1.95	.862	.070	1.81	2.09
	DE	207	1.95	.787	.055	1.84	2.05
	total	357	1.95	.818	.039	1.87	2.04
Q10-5	NoDE	151	2.57	.744	.061	2.45	2.69
	DE	208	2.98	.804	.056	2.87	3.09
	total	359	2.81	.805	.042	2.72	2.89
Q10-	NoDE	151	2.74	.920	.075	2.59	2.89

6	DE	208	3.28	.928	.064	3.16	3.41
	total	359	3.06	.961	.051	2.96	3.16
Q10-7R	NoDE	150	3.41	.761	.062	3.29	3.53
	DE	207	3.38	.759	.053	3.27	3.48
	total	357	3.39	.759	.040	3.31	3.47
Q10-8	NoDE	151	2.83	.870	.071	2.69	2.97
	DE	205	3.06	.755	.053	2.96	3.17
	total	356	2.96	.813	.043	2.88	3.05
Q10-9	NoDE	151	2.44	.771	.063	2.32	2.57
	DE	208	2.78	.694	.048	2.68	2.87
	total	359	2.64	.745	.039	2.56	2.72

Table 25

ANOVA Relative Advantage Comparing Those who had and had not Experienced Distance Education in the Last Twenty-Four Months

		Sums of Squares	df	Mean Square	F	Sig.
Q10-1R	Between Groups	9.33	1	9.33	1.726	.190
	Within Groups	192.978	357	.541		
	Total	193.911	358			
Q10-2	Between Groups	6.948	1	6.948	13.433	.000
	Within Groups	184.645	357	.517		
	Total	191.593	358			
Q10-3R	Between Groups	.001	1	.001	.002	.967
	Within	241.954	357	.678		

	Groups					
	Total	241.945	358			
Q10-4R	Between Groups	.000	1	.000	.000	.985
	Within Groups	238.190	355	.671		
	Total	238.190	356			
Q10-5	Between Groups	14.795	1	14.795	24.347	.000
	Within Groups	216.943	357	.608		
	Total	231.738	358			
Q10-6	Between Groups	25.694	1	25.694	30.056	.000
	Within Groups	305.192	357	.855		
	Total	330.886	358			
Q10-7R	Between Groups	.078	1	.078	.134	.714
	Within Groups	204.802	355	.577		
	Total	204.880	356			
Q10-8	Between Groups	4.862	1	4.826	7.438	.007
	Within Groups	229.699	354	.649		
	Total	234.525	355			
Q10-9	Between Groups	9.826	1	9.826	18.551	.000
	Within Groups	189.098	357	.530		
	Total	198.925	358			

Table 26

Combined Variable Relative Advantage (RA) and Use of Distance Education in the Last Twenty-Four Months

	N	Mean	Std. Deviation	Std. Error	95 % Confidence Interval for Mean	
					Upper Bound	Lower Bound
No DE	151	2.67	.46660	.38826	2.61	2.73
DE	208	2.87	.49490	.36428	2.83	2.93
Total	359	2.79	.48716	.38814	2.75	2.83

	Sums of Squares	df	Mean Square	F	Sig.
Between Groups	3.853	1	3.85	27.464	.000
Within Groups	50.081	357	.140		
Total	53.933	358			

The second characteristic used to explain time to an innovation is *compatibility*. The questionnaire used five Likert questions within question 11 to collect data on the compatibility of distance education to meet the continuing education needs of Pennsylvania physical therapists. Since question 11 was a grouping of five Likert scale questions measuring compatibility, reliability could be assessed through Cronbach's Alpha. All parts of question 11 proved to be reliable (Cronbach's Alpha=.774). Compatibility was measured in both groups, those who had and had not experienced distance education, and significance was achieved at $p < .05$. The group who had experienced DE responded to all aspects of question 11 at four or greater, agreeing that DE for CE was compatible. The group who had not experienced DE rated DE less

compatible on all questions, but never disagreed on any aspect. Thus, they did not disagree that DE was compatible.

Table 27

Compatibility of Distance Education to Meet Continuing Education Requirements

Compatibility Question 11		N	Mean	Std. Deviation	Std. Error	95% confidence interval for mean	
						Lower bound	Upper bound
Q11-1	NoDE	152	3.93	.874	.071	3.79	4.07
	DE	207	4.26	.668	.046	4.17	4.35
	total	359	4.12	.778	.041	4.04	4.20
Q11-2	NoDE	152	3.40	.951	.077	3.25	3.55
	DE	207	4.11	.781	.054	4.00	4.21
	total	359	3.81	.924	.049	3.71	3.90
Q11-3	NoDE	149	4.22	.656	.054	4.12	4.33
	DE	205	4.36	.630	.044	4.27	4.44
	total	354	4.30	.644	.034	4.23	4.37
Q11-4	NoDE	149	3.92	.904	.074	3.77	4.07
	DE	207	4.21	.738	.051	4.11	4.31
	total	356	4.09	.823	.044	4.00	4.17
Q11-5	NoDE	151	3.07	.939	.076	2.92	3.22
	DE	206	3.95	.888	.062	3.83	4.07
	total	357	3.58	1.007	.053	3.48	3.68

Table 28

Compatibility of Distance Education to Meet Continuing Education Requirements ANOVA

		Sums of Squares	df	Mean Square	F	Sig.
Q11-1	Between Groups	9.352	1	9.352	16.109	.000
	Within Groups	207.255	357	.581		
	Total	216.607	358			
Q11-2	Between Groups	43.557	1	43.557	59.309	.000
	Within Groups	262.182	357	.734		
	Total	305.738	358			
Q11-3	Between Groups	1.564	1	1.564	3.804	.050
	Within Groups	144.696	352	.411		
	Total	146.260	353			
Q11-4	Between Groups	7.199	1	7.199	10.933	.001
	Within Groups	233.101	354	.658		
	Total	204.301	355			
Q11-5	Between Groups	67.262	1	67.262	81.296	.000
	Within Groups	293.713	355	.827		
	Total	360.975	356			

The third characteristic *complexity* was measured using seven Likert style questions in question block 6 of the questionnaire. This grouping asked for the subjects perceived ability to use each of the types of distance education, thus would demonstrate the perceived complexity of distance education as continuing education. The seven Likert style questions in question 6 demonstrated internal consistency with a reliability of

alpha=.893. Answers to each type of distance education had Likert response means between 3.12 and 3.93 indicating that the subjects did not agree nor disagree with the statements. The highest perceived ability was for distance education through the use of print based technology followed closely by the Internet/World Wide Web.

Table 29

Perceived Ability for Use of Types of Distance Education

	N	Mean	Std. Deviation	Std. Error Mean
Print based technology	295	3.93	.996	.058
Audiotape	292	3.12	1.281	.075
Videotape	291	3.37	1.186	.070
CD-ROM	288	3.59	1.038	.061
Audio Conferencing	292	3.23	1.054	.062
Video Conferencing	292	3.37	.957	.056
Internet/World Wide Web	291	3.90	.814	.048

Complexity was also explored through part seven of question 10. This Likert scale portion of question 10 specifically asked subjects to rate the statement "CE offered through DE is more complex than traditional CE activities" on a scale of one to five from strongly disagree to strongly agree. Part seven of question 10 was not found to be reliable or significant so the null hypothesis could not be rejected. However this does not mean that the null hypothesis is true either, so there is no evidence that the subjects agreed or disagreed with the statement. See tables 22-25.

The fourth characteristic, *trialability*, is the degree to which the innovation may be trialed or modified. This stimulates peer discussion. The questionnaire attempted to

assess trialability through Likert questions two and five of question 11. Both of these questions were reliable and significant ($p < .000$). The mean scores for both groups combined were 3.81 and 3.58 respectively. The subjects agreed that they were interested in using distance education and they would use distance education in the next 12 months for their continuing education. See tables 26 and 27.

The last and fifth characteristic is *observability*. This is the degree to which the results of the innovation are visible to others in the community. If respected clinicians argue for distance education, it will have a positive impact. Observability was measured with part one of question 11 where the subjects were asked if they were aware of CE activities offered through distance education. Part one of question 11 was both reliable and significant ($p < .000$). The mean score of both groups was 4.12 showing that subjects are aware of CE activities offered through distance education. See tables 26 and 27.

In summary, this study demonstrates that distance education has good relative advantage, good compatibility, good trialability, good observability and no evidence of complexity, however it is important to explore the relationship between these factors and the use of distance education for continuing education by Pennsylvania physical therapists.

In order to examine how the data regarding Rogers' Diffusion of Innovations characteristics may be related to the use of distance education for continuing education by Pennsylvania physical therapists, mean scores of related items were examined using ANOVA for those who had and had not used distance education.

Five Likert scale items from question block 11 on the questionnaire were identified as directly related to the Diffusion of Innovations characteristics and used in the ANOVA. data from questions 11-1, 11-2, 11-3, 11-4, and 11-5 were combined creating a new variable that was named DOIC. Internal consistency was measured on all 5 items with alpha = .774.

The combined variable DOIC demonstrates a total mean score of 2.97 which would be neither agreement nor disagreement on the Likert scale. The mean score was slightly higher when looking only at the group that had experienced DE in the last 24 months (3.09). The difference between the scores of those having had DE and those who had not was significant (.000) indicating to reject the null hypothesis. When all characteristics for the Diffusion of Innovations are combined there is neither a positive nor a negative indication that physical therapists in the state of Pennsylvania will adopt DE for their mandated continuing education hours.

Table 30

Combined Variable Diffusion of Innovations Characteristics (DOIC) Education and Use of Distance Education in the Last Twenty-Four Months

	N	Mean	Std. Deviation	Std. Error	95 % Confidence Interval for Mean	
					Upper Bound	Lower Bound
No DE	150	2.80	.46660	.03810	2.73	2.88
DE	204	3.09	.49490	.03255	3.03	3.16
Total	354	2.97	.48716	.02589	2.92	3. 02

	Sums of Squares	df	Mean Square	F	Sig.
Between Groups	7.460	1	7.46	34. 407	.000
Within Groups	76.315	352	.217		
Total	83.774	353			

Analysis of Demographics

Research question number 3 asked which demographic characteristics influence physical therapists use of distance education to meet mandated continuing education requirements in Pennsylvania. Demographic factors including gender, age, highest degree attained, years in practice, direct access status, practice setting and community were analyzed to reveal any potential influence on subjects' use of distance education.

Community

The literature predicts that rural physical therapists would use distance education more than urban or metropolitan because of their lack of access to live education sources. This was not statistically significant ($p < .958$) and the mean use by each group was actually similar. The rural mean use of distance education in the last 24 months was

11.66 hours, the urban mean use of distance education was 12.49 hours, and the metropolitan mean use of distance education was 12.88 hours over the last two years.

Table 31

Community of Practice and Use of Distance Education

Community	Average Use of Distance Education in last 2 years (hours)	P value	F value
Urban	12.49	.948	.043
Rural	11.66		
Metropolitan	12.88		

Age

There was no significance to the use of distance education by age ($p < .961$). Age data was categorized in groups to match the APTA demographic study. The largest mean use of DE in the last 24 months was 17.03 hours by ages 35-39, with a second of those ages 30-34 with 14.03 hours. The smallest mean was zero for those ages 20-24.

Table 32

Age Category and Use of Distance Education

Age Category	Average Use of Distance Education in Last 2 Years (hours)	P value	F value
20-24	0	.961	.312
25-29	12.55		
30-34	14.03		
35-39	17.03		
40-44	12.67		
45-49	10.31		
50-54	11.51		
55-59	10.47		
60-64	7.48		
65+	13.63		

Gender

There was no significance to the use of distance education by gender ($p < .584$). Males reported a higher DE use in the last 24 months with a mean score of 13.34 hours.

Table 33

Gender and Use of Distance Education

Gender	Average Use of Distance Education in Last 2 Years (hours)	P Value	F Value
Male	13.34	.584	.301
Female	11.53		

Direct Access Status

There was no significance to the use of distance education by direct access status ($p < .198$). Those holding the direct access license reported a higher use of DE with a mean score of 14.34 hours.

Table 34

Direct Access Status and Use of Distance Education

Direct Access Status	Average Use of Distance Education in Last 2 Years (hours)	P Value	F Value
Yes	14.34	.198	1.663
No	10.02		

Practice Setting

When practice setting was correlated with DE use, no significance ($p < .933$) was found and the null hypothesis could not be accepted. Descriptive results reveals that those in academia had the highest mean use of DE with an average of 38 hours and skilled nursing facilities were a distant second with 18.43 hours. The lowest use of DE was in subjects practicing in health and wellness facilities.

Table *35*

Practice Setting and Use of Distance Education in the Last Twenty-Four Months

Practice Setting	Average Distance Education over the past 2 years (hours)	P Value	F Value
Acute/subacute hospital or rehab (inpatient)	10.24	.933	.376
Health system or hospital based outpatient facility or clinic	16.54		
Private outpatient office or group practice	11.14		
SNF/ENF/ICF	18.43		
Patients home/home care	12.10		
School system (preschool/primary/secondary)	1.50		
Academic institution (post secondary)	38		
Healthy and wellness facility	1		
Other	17		

Highest Academic Degree

The null hypothesis could not be accepted when correlating highest academic degree attained with use of distance education because there was no significance found ($p < .933$). The subjects with the tDPT reported the highest use of DE with a mean score of 14.87 hours and the DPT subjects were second with a mean score of 13.26 hours. The lowest use of DE was indicated by those with a PhD with a mean score of 9 hours.

Table 36

Highest Academic Degree Attained and Use of Distance Education

Highest Academic Degree	Average Distance Education over the Last Two Years (hours)	P Value	F Value
Baccalaureate Degree	11.09	.933	.264
Master's Degree	10.33		
PhD	9.00		
DPT	13.26		
tDPT	14.87		
Other	12.13		

Years In Practice

When years in practice were correlated with DE use in the last 24 months, there was no significance found ($p < .963$). Descriptive data revealed that the subjects with 11-15 years of practice had used the most DE with a mean score of 15.49 hours in the last 24 months. The lowest mean was 3.50 hours in those who had 1-3 years in practice.

Table 37

Years in Practice and Use of Distance Education

Years in Practice	Average Distance Education over the Last Two Years (hours)	P Value	F value
<1	9.67	.963	.276
1-3	3.50		
4-5	14.06		
6-10	14.02		
11-15	15.49		
16-20	14.93		
21-30	9.10		
31+	12.58		

Qualitative Comments

Subjects were very generous with written comments in response to the last question on the survey which was an open ended request to enter comments or feelings on their use of distance education for continuing education or their thoughts on the use of distance education for continuing education. The overall impression of the comments was positive for ease of access and decrease in cost, but there was a great deal of concern for the use of distance education to teach the hands on or practical skills involved in physical therapy. As one subject sums it up:

> There are excellent distance CE courses out there by highly respected experts in their topic areas. For hands-on courses involving mobilization or manipulation, I do not feel online courses are appropriate. But overall, from a fiscal, flexibility and time management perspective I am very pro distance education.

Subjects were unsure if distance education could count toward their newly mandated CE requirements as this subject states:

> If Pennsylvania allows distance education via Internet to count as continuing education, especially or my direct access license it would benefit me greatly to get all of my continuing education hours completed.

The overall consensus of the comments was positive especially for those that had life experiences that limited their time, ability to travel or income. In these situations the overall comment was that the distance education opportunity was invaluable. Reflections on experiences were mostly positive on didactic and knowledge-based information and on the ability to review the information multiple times for additional practice and reinforcement. Drawbacks mentioned were less interaction with the instructor and peers during the course. Many subjects who had not yet experienced distance education were excited that they might be able to use distance education for the Pennsylvania direct access license requirements for CE hours on ethics and legal issues.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS

The purpose of this study is to collect information about the use of distance education by physical therapists in the state of Pennsylvania to meet their needs for mandated continuing professional education. This was accomplished using a questionnaire that included questions investigating Rogers' Diffusion of Innovation Theories and demographic information. The questionnaire was a modified version of a survey designed previously for healthcare professionals in Texas. The theoretical framework for this study is based on Rogers' Theories of Innovation.

Chapter one presented a statement of the problem and the theoretical framework that would be used to examine how physical therapists in the state of Pennsylvania are using distance education to meet mandated continuing education requirements. It was hypothesized that several demographic factors and characteristics as described by Rogers' Diffusion of Innovations and other demographic characteristics would be associated with the use of distance education by physical therapists in Pennsylvania to meet mandated continuing education requirements. Chapter two presented a literature review of Rogers' Diffusion of Innovations and the background information that support the use of distance education for continuing education. Chapter three described the adoption and modification of the online questionnaire for use in this survey, and the sampling procedures. Chapter four presented the results of the data analysis collected from the survey. Analysis of variance, chi-square analysis, discriminate analysis, and nonparametric analysis were used to determine the use of distance education by

Pennsylvania physical therapists to attain their mandated continuing education, demographic factors that influence their decision, and Rogers' Diffusion of Innovations characteristics.

Summary of Research Findings for Research Question One

The history of CE and the profession of physical therapy in chapters one and two provided a solid paradigm for studying research question one which asked how physical therapists in the state of Pennsylvania are using distance education to meet mandated continuing education requirements.

Participation in Continuing Education

Specifically looking at the findings of the survey, two characteristic groups were identified: those who had used distance education for continuing education in the last 24 months and those who had not. The two groups were close in size with 208 that had used distance education and 153 that had not used distance education for their continuing education in the last 24 months. Fifty-seven percent of the subjects used at least some distance education to complete their continuing education. On average, the subjects completed 12.25 hours of the required continuing education through distance education. Since the mandated requirement for Pennsylvania licensed physical therapists is 30 hours every 24 months, this would amount to just under half of their required continuing education hours. Although 42.3% of the subjects did not report completing any DE in the last 24 months, 82.8 % of the subjects reported that they had done some CE through

distance education in their career with a range of 0 and 1500 hours and a mean of 67.66 hours. Less than 20% of the subjects in the study had never experienced DE.

Access to Technology

In question 11, subjects agreed that they had access to the technology needed to use distance education. 360 out of 361 subjects responded to question 8 that they had a computer at home. 355 stated that they also had Internet access at home. In addition to these findings 307 reported having computer access at work and 304 had Internet access at work.

Comfort With Technology

Subjects agreed with a statement in question 11 that indicated that they were comfortable with the technology used for DE. When specifically questioned on types of DE, subjects were most comfortable using print technology followed by Internet/Word Wide Web.

Delivery Method

In addition to the number of distance education hours used, the survey assessed the type of distance education that was accessed. Statistical analysis demonstrated that the most frequently used types of distance education were print based and Internet, with 31.5% of the subjects responding that they use print based distance education either often or always and 37.7% of the subjects responding that they use Internet based distance education either often or always. The most rarely used types of distance education were

audiotape and videotape, with 88.2% of the subjects reporting that they rarely or never use audiotape and 79.9% of the subjects reporting that they rarely or never use videotape.

Provider Type

The most frequently used provider for CE as DE was a national professional organization and the least frequently used provider was a university.

Summary of Research Findings for Research Question Two

Research question 2 asked what characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapist's use of DE to meet mandated continuing education requirements. This question provided the framework for the motivation and willingness of physical therapists in Pennsylvania to use distance education for continuing professional education.

Rogers' Innovator Categories

Rogers grouped adopters of innovations into five categories based on their degree of innovativeness ("Innovators, Early Adopters, Early Majority Adopters, Late Majority Adopters, and Laggards") (Rogers, 1962, p.25). Each of these five categories had defining characteristics. The characteristics of the subjects in this study did not coincide with the predictions of Rogers' categories. The most innovative who Rogers predicted would use DE more quickly were not the youngest or the most specialized, and the laggards who Rogers predicted would be the ones who had not yet adopted DE were not the oldest or the least specialized. There was no pattern to predict DE use evident to support Rogers' innovator categories in this group of subjects.

Innovation-Decision Process

Rogers' theory describes the diffusion of an innovation through a process of identifying four elements: innovation, communication channels, time, and the social system.

Innovation

The first element, Innovation, is described by assessing the innovation decision process that involves a series of decisions and actions including knowledge, persuasion, decision implementation, and confirmation. Eighty-eight point six percent of the subjects surveyed responded that they are aware of distance education available for continuing education to meet mandated requirements and that the most critical factors in deciding on a continuing education course are content, quality, and the applicability of information. 57.6% of the subjects are actively using distance education to meet their continuing education requirements. Those subjects that are using distance education confirm that their distance education experience was positive and believe that their CE experience will be positive in the future.

Communication Channels

The second element of Rogers' Diffusion of Innovation Theory is Communication Channels. This is the process by which the adopters obtain a mutual understanding of the innovation through the sharing of information. Subjects indicated that the most common provider of DE for them was their national professional organization indicating that this was the source, which they used to obtain and share that information.

Time

The third element is time and this refers to the rate of adoption of the innovation of DE for CE by Pennsylvania physical therapists. Five characteristics explain this timing: relative advantage, compatability, complexity, trialability, and observability. This results of this study demonstrated that according to the subjects' responses, DE has good relative advantage, good compatability, good observability and no evidence of complexity.

Combined Factors

In order to explore the relationship of these multiple factors on the use of DE for CE by Pennsylvania physical therapists, five specific survey questions directly related to the Diffusion of Innovations characteristics were combined into one variable. This combined variable indicated neither agreement nor disagreement of the subjects. Thus there is neither a positive or negative indication that physical therapists in the state of Pennsylvania will adopt DE for their mandated continuing education hours.

Research Question Three

Research question number 3 asked which demographic characteristics influence physical therapists use of distance education to meet mandated CE requirements in Pennsylvania. Several demographic characteristics were examined for potential effects on the adoption of DE for CE, including community, age, gender, direct access status, practice setting, highest academic degree, and years in practice.

Community

The literature predicts that rural physical therapists would use distance education more than urban or metropolitan physical therapists because of their lack of access to live education sources. This was not statistically significant ($p < .958$). The mean use by each group was similar. The rural mean use of distance education was 11.66 hours, the urban mean use of distance education was 12.49 hours, and the metropolitan mean use of distance education was 12.88 hours over the last two years. There was no indication that physical therapists living in areas with less access to traditional courses used distance education more often.

Age

There was no significance to the use of DE by age ($p < .961$). The largest mean use of DE in the last 24 months was for age group 35-39 and the smallest mean use of DE was for age group 20-24. These were not the youngest or the oldest groups.

Gender

Males reported a higher mean use of DE in the last 24 months, however it was not significantly different ($p < .584$).

Direct Access Status

Physical therapists holding a direct access license did report a higher use of DE in the last 24 months and this may be due to the more detailed direct access continuing education requirements. These results were not significant ($p < .198$).

Practice Setting

The subjects who practiced in academia had the highest use of DE in the last 24 months and the lowest use was in those practicing in health and wellness facilities. This may have been partially due to the high number of academicians and low number of health and wellness physical therapists in the subject population. Results were not significant ($p < .933$).

Highest Academic Degree

Subjects possessing the tDPT reported the highest use of DE for CE. This may be due their use of DE to attain their tDPT as many of these academic programs utilize DE. Those holding a PhD indicated the lowest use of DE. This was not significant ($p < .933$)

Years of Practice

When years of practice was correlated with DE use in the last 24 months, there was no significance ($p < .963$). The subjects with 11-15 years of practice reported the largest mean score of DE use and subjects with 1-3 years of practice reported the lowest mean score of DE use.

Qualitative Comments

Overall qualitative comments on DE were positive for the ease of access and lower cost of DE, however there was a lot of concern expressed for the use of DE to teach the hands on or practical skills involved in physical therapy as well as the reduced interaction with the teacher and peers. Subjects were also unaware of the guidelines by the Pennsylvania State Board of Physical Therapy for the use of DE as mandated CE.

Reflections on DE experiences were positive on didactic information and subjects liked having the ability to review the material multiple times. Those with life experiences restricting their time or income reported that DE for mandated CE was invaluable to them. Subjects who had not yet experienced DE were excited about the possibility of fulfilling their mandated CE with this method.

Conclusions

The Pennsylvania State Board of Physical Therapy has mandated the requirement of 30 continuing education hours every 24 months. Direct access physical therapists are required to make 10 of those 30 hours directly involved in diagnosis. 86.6% of Pennsylvania physical therapists report that they are aware of distance education and 82.8% have used DE for CE at some point in their career. Over the past 24 months, 57% report incorporating some form of DE into their 30 required hours. On average, 12.25 of the required CE hours are completed through DE. The most frequent type of DE used by physical therapists in the state of Pennsylvania is Internet/World Wide Web, followed closely by print. The types of DE that are used the least are audiotape and videotape.

When evaluating the innovation-decision process, physical therapists in Pennsylvania consider course content, quality and applicability of the information first, and time away from work or home last. The most commonly used provider of DE is a national professional organization such as APTA. Those subjects that report using distance education confirm that their distance education experience was positive and believe that their CE experience will be positive in the future.

Using Rogers's method to determine rate of adoption, it appears that Pennsylvania physical therapists are already adopting DE. The results of this study indicate that, according to the subject responses, DE has good relative advantage, good compatibility, good observability and no evidence of complexity. If these factors are compiled together into one measurable factor, the findings demonstrate that physical therapists in the state of Pennsylvania neither agree nor disagree with the use of DE to complete mandated CE hours.

When looking for demographic factors leading to a decision to adopt DE as CE, no significant patterns evolved. There was a tendency to see DE used more by males, those with a tDPT, those holding a direct access license, those in the age group 35 to 39 years and those in practice between 11 and 15 years. There was a slightly higher use of DE by physical therapists working in the academic environment and physical therapists living in a metropolitan area.

Recommendations for Future Research

It is recommended that questions pertaining to membership in the American Physical Therapy Association (APTA), positions held in APTA, and financial status be added to the questionnaire for future research. It would have been useful to have this information for the identification of opinion leaders and for the analysis of Rogers' theories on social status and wealth.

Several of the comments from the subjects involved concerns on the use of distance education for teaching practical skills involved in physical therapy such as manual therapy techniques. Further research is needed to identify the ability of distance

education used as continuing education to teach practical skills in physical therapy. There are some studies available concerning learning a practical skill through distance education, but none specific to the skills of a physical therapist. Research that considers the possible increased ability of a fully trained physical therapist to learn a practical skill through distance education should be considered.

Other subjects noted concerns on the quality of distance education and if it will uphold the standards of traditional continuing education. This is yet to be determined and research is needed to identify the specific characteristics and standards that would be recommended for distance education in physical therapy continuing education.

There appeared to be a lack of knowledge of how the distance education courses would fit into physical therapy mandated continuing education requirements in the state of Pennsylvania. Since the Pennsylvania State Board of Physical Therapy does indeed count these credits and does approve these courses, the State Board needs to more clearly communicate this to the Pennsylvania licensed physical therapists. A study on how to best disseminate this information might be useful, as the present method of the Pennsylvania State Board of Physical Therapy does not appear to be effective.

Implications of the Study

A great deal of useful information can be obtained from this study combined with Rogers Innovation Theory to assist providers of continuing education in designing and marketing their courses. First and foremost DE as CE has been adopted by Pennsylvania physical therapists and its use is on the rise. If CE providers do not offer this choice, they should consider it. The most commonly used forms of DE are print and

Internet/World Wide Web. DE courses should incorporate these methods. Audiotape and videotape are not preferred and appear to be declining in popularity.

Physical therapists choose CE courses by content, quality and the applicability of the information. They are not so concerned with time away from home or work or cost. Physical therapists prefer interaction with the instructor and peers in the course, so courses should incorporate DE methods that create this environment. National professional organizations are the most common sources of DE and marketing or associating a CE course with an organization such as the American Physical Therapy Association (APTA) should be considered. DE courses were once thought to be an option for only those who could not travel to attend a traditional course, but this study revealed that even physical therapists in metropolitan areas are taking advantage of DE for their CE requirements.

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Appendix A: Questionnaire

Default Question Block

Q1. Please read these important definitions to assist in completing this survey:

Distance Education or Course = Education completed at a distance including print based technology, audiotape, videotape, teleconferencing, CD-ROM, internet or web based courses.

Traditional Education or Course = Education completed in a face to face environment.

Continuing Education = Education completed after a physical therapy license has been obtained to improve skills as a physical therapy professional.

Q2.
How many hours of continuing education activities have you participated in during the past 24 months? Please use a number as your answer.

Q3.
How many of the hours indicated in question 1 (Q1) were completed through distance education (i.e., print based techonology, audiotape, videotape, teleconferencing, CD-ROM, internet/web-based course)? Please use a number as your answer.

Q4. How many hours of continuing education would you estimate you have completed through distance education over the course of your career as a physical therapist professional? Please use a number as your answer.

Q5. Please indicate the frequency of your use of the following distance education technologies to meet your continuing education requirements using the scale listed below.

	Never	Rarely	Sometimes	Often	Always
Print based technology	○	○	○	○	○
Audiotape	○	○	○	○	○
Videotape	○	○	○	○	○
CD-ROM	○	○	○	○	○
Audio conferencing	○	○	○	○	○
Video conferencing	○	○	○	○	○
Internet / World Wide Web	○	○	○	○	○

Q6. Please indicate your perceived ability to use the following distance education technologies to meet your continuing education requirements using the scale listed below.

	None	Low	Moderate	High	Expert
Print based technology	○	○	○	○	○

Audiotape	○	○	○	○	○
Videotape	○	○	○	○	○
CD-ROM	○	○	○	○	○
Audio Conferencing	○	○	○	○	○
Videoconferencing	○	○	○	○	○
Internet/ World Wide Web	○	○	○	○	○

Q7. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
My overall experience using distance education to meet my CE requirements has been positive.	○	○	○	○	○
I expect my future experience using distance education to meet my CE requirements to be positive.	○	○	○	○	○

Q8. Please indicate the provider of the continuing education activities that you attended through distance education (Indicate as many as apply).

- ☐ Your employer
- ☐ A national professional organization (APTA, NATA, etc)
- ☐ A university
- ☐ A private provider of CE activities

Q9. Please indicate the extent to which you agree or disagree with the following items.
The following factors influence my participation in continuing education activities provided either through distance education or traditional approaches:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Quality	○	○	○	○	○
Content	○	○	○	○	○
Applicability of information	○	○	○	○	○
Availability	○	○	○	○	○
Convenience	○	○	○	○	○
Reliability of the source	○	○	○	○	○
Location close to work/home	○	○	○	○	○
Cost	○	○	○	○	○
Time away from work	○	○	○	○	○
Time away from home	○	○	○	○	○

Q10. Please indicate the extent to which you agree or disagree with the following items. Continuing education offered through distance education.....

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
costs more than traditional CE activities.	○	○	○	○	○
offers a higher quality of instruction than traditional CE activities.	○	○	○	○	○
offers less interaction with the instructor than traditional CE activities.	○	○	○	○	○
offers a lower level of interaction with other participants than traditional CE activities.	○	○	○	○	○
offers more advantages than traditional CE activities.	○	○	○	○	○
is more compatible with my CE needs than traditional CE activities.	○	○	○	○	○
is more complex than traditional CE activities.	○	○	○	○	○
offers more opportunities to experiment without risk than traditional CE activities.	○	○	○	○	○
results in more observable benefits than transitional CE activities.	○	○	○	○	○

Q11. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am aware of CE activities delivered through distance education.	○	○	○	○	○
I am interested in using distance education to meet my CE requirements.	○	○	○	○	○
I have access to the technology needed to participate in CE activities provided through distance education.	○	○	○	○	○
I am comfortable with the technology used in CE activities provided through distance education.	○	○	○	○	○
I will use distance education to meet my CE requirements in the next 12 months.	○	○	○	○	○

Q12. Which of the following best describes the type of facility or institution in which you currently do all or most of your work (your primary position)?

- ◯ Acute/sub-acute hospital or rehab (inpatient)
- ◯ Health system or hospital based outpatient facility or clinic
- ◯ Private outpatient office or group practice
- ◯ SNF/ENF/ICF
- ◯ Patient's home/ home care
- ◯ School system (preschool/primary/secondary)
- ◯ Academic institution (post secondary)
- ◯ Health and wellness facility
- ◯ Other

Q13. What is your highest academic degree?

- ◯ Baccalaureate degree
- ◯ Master's degree
- ◯ PhD
- ◯ DPT
- ◯ tDPT
- ◯ Other

Q14. What is your gender?

- ◯ Male
- ◯ Female

Q15. What is your ethnicity?

- ◯ African American
- ◯ Asian
- ◯ Hispanic
- ◯ White
- ◯ Other

Q16. How would you characterize the community in which you work?

- ◯ Metropolitan (population of 150,000+)
- ◯ Urban (population 75,000 to 149,999)
- ◯ Rural (population of less than 30,000)

Q17. How would you describe your employment status and your primary work responsibilities?

- ◯ Full-time employee, direct patient care
- ◯ Part-time employee, direct patient care
- ◯ Full-time employee, management / administration
- ◯ Part-time employee, management / administration
- ◯ Other

Q18. Do you have (choose as many as apply):

- ☐ A computer at home?
- ☐ Internet access at home?
- ☐ Access to a computer at work to use for CE activities?
- ☐ Internet access at work to use for CE activities?

Q19. What is your age in years?

Q20. How many years have you been a licensed physical therapist?

Q21. Do you hold a license for Direct Access Physical Therapy in the state of Pennsylvania?

- ◯ Yes
- ◯ No

Q22. Please type your feelings or comments on your experiences with distance education as continuing education or your thoughts on using distance education for continuing education.

Q23. Thank you for participating in this study.

Appendix B: Initial Email Invitation

Dear _____,

I am sure that you are aware of the new Pennsylvania State Board of Physical Therapy mandates for continuing education. With these new demands, continuing education through distance learning is emerging as a popular option for physical therapists. It is vital for our profession to look at the quality and value of this form of education. I am a doctoral student at Indiana University of Pennsylvania and a licensed physical therapist in Pennsylvania and I am inviting you to participate in my dissertation study. It is my hope to perform this research to demonstrate the use and participant satisfaction of distance education for physical therapist continuing education.

I am hopeful that you will consider participating in this 10-minute online anonymous survey to help me obtain this valuable information for our profession. Please visit the following web link by clicking on the link or pasting it into your browser. By clicking on the link, you are agreeing that you have read the information listed at the end of this email and are consenting to participate in the study.

https://iup.qualtrics.com/SE/?SID=SV_5bcJ6AWAlroIE1T

Please complete the survey by July 26, 2013

I hope that you will be able to participate in this important study and thank you in advance for your time. If you know any other Pennsylvania licensed physical therapists that may be interested in participating, please forward this email.

Christine Romani-Ruby PT, MPT, ATC

Informed Consent

1. You understand that this research study is examining the use of distance education to meet the continuing education requirements of physical therapists in the state of Pennsylvania. This study will attempt to discover if relationships exist between specific demographic variables:

a) and the use of distance education to meet continuing education requirements.
b) and the perception of using distance education to meet continuing education requirements.
c) and the perception of distance education and its reported use to meet continuing education requirements.

2. You understand that this survey is being sent to 2,200 physical therapists licensed in the state of Pennsylvania.

3. You understand that you are under no obligation to complete this survey.

4. You understand that your participation is voluntary and you can choose to respond or not to respond without any penalty.

5. You understand that you may refuse to answer without any harm to you on any questions that make you uncomfortable.

6. You understand that your answers to this survey are anonymous and blinded by the web site link that you will access. The researcher will have no knowledge of your identity and will not be able to attach your identity to your responses.

7. You understand that this research study has been reviewed and approved by the Institutional Review Board (IRB) of Human Subjects Research at Indiana University of Pennsylvania. For research related problems or questions in regard to subject rights, you may contact the IRB by phone at 724-357-7730 or by email at irb-research@iup.edu.

8. You understand that by completing the website survey, you are demonstrating that you have read and understood the information provided on this information sheet and that you are agreeing to participate in this study.

10. If you have any questions, you understand that you can contact the researcher for this study as follows:

Principle Investigator
Christine Romani-Ruby PT, MPT, ATC
Graduate Student in Administration and Leadership Studies at Indiana University of PA
By US Mail: 85 Sichi Hill, Eighty Four, PA 15330
By email: romaniruby@calu.edu
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By email: George.Bieger@iup.edu
By phone: 724-357-3285

Appendix C: Second Email Invitation

Dear _____,

My name is Christine Romani-Ruby and I am a graduate student at Indiana University of Pennsylvania and a licensed physical therapist in Pennsylvania.

Two weeks ago I sent you an invitation to participate in an online survey on the use of distance education by physical therapists in Pennsylvania for continuing professional education. I know that you are busy and I amsending this gentle reminder encouraging you to help. I really need your participation. If you have not completed the anonymous survey, please click on the web link below or paste it into your browser. It will only take 10 minutes.

https://iup.qualtrics.com/SE/?SID=SV_5bcJ6AWAlroIE1T

Please complete the survey by July 26, 2013.

Thanks in advance for your time,

Christine Romani-Ruby PT, MPT, ATC

Appendix D: Pilot

The purpose of the study is to investigate the use and adoption of distance education to meet continuing education (CE) requirements by physical therapists in the state of Pennsylvania. The study will be conducted using a survey instrument that was adopted from The Tennessee Academy of Family Physicians Survey and will be administered to a cluster sample of Pennsylvania licensed physical therapists via an online format. The study will answer the following research questions:
1) How are physical therapists in Pennsylvania using distance education technologies to meet mandated continuing education requirements?
2) What characteristics, as described by Rogers' Diffusion of Innovations, are associated with physical therapists in Pennsylvania's use of distance education to meet mandated continuing education requirements?
3) Which demographic characteristics such as age, educational level, living area, gender, area of expertise, or job position influence physical therapists' use of distance education to meet mandated continuing education requirements in Pennsylvania?

Below you will find a link to the online survey so that you can view the online flow of the questions. There are two areas where the survey will skip questions according to the participant's answer. I have also attached a pdf of the entire questionnaire so that you may read each of the questions or make notes. Below are items that I would like you to consider as you review the survey.

1) Are the instructions for completing the survey clearly written?
2) Are the questions easy to understand?
3) Do respondents know how to indicate responses?
4) Are the response choices mutually exclusive?
5) Are the response choices exhaustive?
6) Can the respondents correctly use the commands of the web-based survey?
7) Do respondents know how to change their answers?
8) Is the privacy of the respondents respected and protected?
9) Do you have any suggestion regarding the addition or deletion of questions, clarification of instructions, or improvements in questionnaire format?

Link to the survey:
https://iup.qualtrics.com/SE/?SID=SV_4T1pC22jo6Vefbu

For those of you that I will not see in person, please send your comments back to me via email at romaniruby@calu.edu or you may fax any comments to 877-716-4879.

Thank you in advance for assisting me with this endeavor.