FACULTY LIVED EXPERIENCES INTEGRATING TECHNOLOGY-ASSISTED EDUCATIONAL PRACTICES INTO AN ENTRY LEVEL PHYSICAL THERAPY CURRICULUM: AN INTERPRETATIVE PHENOMENOLOGICAL ANALYSIS

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Abstract

Across the nation, innovative technologies have changed instructional practices throughout higher education. In physical therapy (PT) programs, faculty must work to integrate technology into a complex academic curriculum that prepares students to be hands-on healthcare practitioners. The purpose of this study was to uncover how physical therapy faculty make sense of their lived experiences integrating innovative technology-assisted educational practices (ITAEP) into their curriculums. This researcher used an interpretative phenomenological analysis (IPA) approach to explore their experiences, and gather data through individualized, semi-structured interviews. Data analysis yielded three superordinate themes: awareness of barriers, appreciation for educational contributions, and respect for program integrity. Findings revealed that faculty experienced internal and external barriers that affected technology integration efforts. Additionally, they were encouraged by the ability of technology to reach diverse learners and promote metacognition, and were enthusiastic about the pedagogical advantages of student input. Further, in-person instruction and intentional, judicious technology integration was perceived as crucial to program integrity. Findings are relevant to administrators and PT faculty as they work to advance quality pedagogy. They are also of value to technical support specialists as they strive to provide technology based training and guidance, and to students as they seek to expand their knowledge. Additional research is needed to further explore faculty experiences with specific innovations, investigate the ways in which technology contributes to pedagogy within the PT curriculum, and obtain feedback about the role of technology in a traditional face-to-face health professions program.
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Chapter 1: The Research Problem

Introduction

Innovative technologies and corresponding pedagogies have changed instructional practices throughout higher education curricula (Nworie, 2014; Osika, Johnson, & Buteau, 2009). Across the nation, institutions, and the educators that contribute to their success, are under pressure to adopt new teaching technologies and modalities, advance discovery and creativity, and find ways to improve pedagogy (Anderson, Maier, & Shepard, 2010; McQuiggan, 2012; Spanier, 2010). As higher education institutions have invested heavily in technology infrastructure in recent years, assisting faculty with integrating technology into instruction has been cited as one of the most important issues facing higher education (Annan, 2008; Blakely, 2015). For physical therapy faculty, technology initiatives must include the adoption of innovative technology assisted educational practices (ITAEP) into a complex academic environment that prepares students for a hands-on profession (Veneri, 2011). To understand these initiatives, it is wise to explore the ways in which faculty have experienced the integration of ITAEP into their curriculums, and capture their perspectives on the technology-assisted evolution of teaching and learning. The purpose of this qualitative study was to uncover how physical therapy faculty make sense of their lived experiences integrating innovative technology assisted educational practices into their curriculums. This was achieved through an interpretative phenomenological analysis that was designed to extract deeper meaning from, and make sense of, those personal experiences.

The widespread movement toward innovative educational practice is fueled, in part, by a shift in student demographics, a changing competitive landscape, and calls for higher levels of accountability (Spanier, 2010). In some institutions, a focus on technology-based learning has
become integral to their mission, and is considered critical to the long-term strategy of the school (Anderson, et al., 2010). Reform initiatives, seen comprehensively throughout many programs in higher education, have been extensive in entry level physical therapy (PT) programs offered at many universities, in both the didactic, or classroom and laboratory components of the curriculum, as well as in clinical education components that take place at external sites (Anderson & Tunney, 2014; Veneri, 2011). They are initiatives supported not only by university leadership, but also by changes in the PT profession that have elevated degree requirements for entry level practice, called for an expansion in the scope of practice, and championed policies and legislation that advocate for greater autonomy in clinical practice (Baumgartner, 2012; Commission on Accreditation in Physical Therapy Education, 2014a; Veneri, 2011). While PT students one generation ago were educated at the baccalaureate level, as of 2012, 210 of 211 accredited United States physical therapy programs conferred upon their graduates an entry-level Doctor of Physical Therapy (DPT) degree (Baumgartner, 2012). This degree, which focuses upon clinical excellence, is now mandated as the first professional degree for all established and developing programs. This mandate was effective as of December 31, 2015. (Commission on Accreditation in Physical Therapy Education, 2015).

The DPT was embraced as part of a vision that seeks to advance nationwide direct access, or access to physical therapy services without a physician referral (Veneri, 2011). It accompanies evolving health care reform initiatives, as well as the need to provide care to a population whose average age and incidence of chronic disease continues to rise (Baumgartner, 2012; Sullivan et al., 2011). Additionally, elevated educational requirements will help the profession achieve its goal of moving beyond a medical model of service delivery that has been constrained to treatment of episodic health events, and into a public health model that includes PT participation
in the prevention of disease or injury (Sullivan et al., 2011). In order to effectively prepare
students for the 21st century health care arena, entry-level PT programs have expanded the
breadth and depth of their curriculums, and emphasized the need for the adoption of new ideas
and practices (Baumgartner, 2012; Veneri, 2011).

Statement of the Problem

To meet contemporary challenges in health care delivery, demands are placed upon PT
faculty members to critically reflect upon traditional practices and develop new pedagogical
approaches that appropriately integrate ITAEP (Moore & Smith, 2012). Congruent with Bloom’s
taxonomy, a time-honored classification of different objectives that educators set for students
(Ferris, 2010), learning in PT programs must take place across cognitive, affective, and
psychomotor domains (Commission on Accreditation in Physical Therapy Education, 2014b).
Within PT education, while cognitive development is paramount, and affective learning is
crucial, there is also a unique emphasis upon complex psychomotor proficiency and competent
execution of certain manual skills (Anderson & Tunney, 2014; Smith et al., 2006) that must be
achieved during the didactic portion of the program. Mastery of PT program essential functions
is challenging not only for students, but also for the educators striving to expand methodologies.
Some of the approaches that have been worthy of scholarly attention over the past decade
include video-based learning, high fidelity patient simulation, personal response systems, and
online interactive, collaborative, and problem-based learning strategies including shared
documents, asynchronous discussion boards, interprofessional learning platforms, and flipped
classroom models (Baumgartner, 2012; Comer & Lenaghan, 2012; Noguera, Jiminez, & Osuna-
Perez, 2013; Nworie, 2014; Silberman, Panzarella, & Melzer, 2013.) Faculty efforts to integrate
these technology driven strategies into curricula can be complicated by individual beliefs and
perceptions, adherence to certain instructional styles, or a desire by individual instructors to teach as they were taught (McQuiggan, 2012; Osika, Johnson, & Buteau, 2009). However, a failure to adopt ITAEP that facilitate meaningful learning and skill acquisition could have a negative impact on the future health care of society, and threaten the integrity of the PT profession (Stein, Fujisaki, Davis, & McLean, 2012; Sullivan et al., 2011). It is therefore important to be attentive to research that explores faculty lived experiences integrating ITAEP, and ascribes meaning to reflective insights regarding the influence of ITAEP on pedagogy.

Faculty experiences with educational technology and innovative educational strategies have been documented and explored to a small extent in higher education literature. In two different studies, qualitative inquiry has been used to explore nursing faculty experiences integrating innovative technologies into their curriculums (Fiedler, Giddens, & North, 2014; Freed, Bertram, & McLaughlin, 2013). In a contemporary phenomenological study, Blakely (2015) explored technology experiences of six late career faculty who had taught a wide variety of undergraduate and graduate level courses. The author did not identify the academic expertise of the participants. In an action research study, McQuiggan (2012) used qualitative methodology to analyze the extent to which transformative learning took place among faculty who participated in professional development activities for online teaching. The researcher’s purposeful sampling included faculty from departments of education, engineering, and public affairs in one institution. Foord-May (2006) looked more specifically at the experiences of physical therapy faculty in a qualitative case study that explored the transition from a traditional lecture-based instructional model to a contemporary problem-based instructional model that used clinical problems to address educational objectives. The author presented nine themes that emerged from the data to frame the group’s change process. Focusing on a different type of educational
strategy, Pechak & Black (2013) investigated PT faculty perspectives on international clinical education, through qualitative research that used content analysis to identify the challenges and benefits of this approach.

These studies contribute meaningfully to a body literature that acknowledges faculty as integral to the evolution of higher education. However, gaps in the literature continue to exist. Qualitative studies that explore faculty experiences in an increasingly technology driven post-secondary environment are rare. At this time, no studies could be found that use an interpretative phenomenological approach to focus on the personal meaning of faculty experiences with ITAEP. Additionally, many studies fail to recruit faculty from health professions programs, where the acquisition of clinical skills and competencies, in addition to the mastery of theoretical knowledge, must be achieved. While some studies have centered on physical therapy faculty, they have done so by focusing specifically on educational methodology or approach, or by looking at the frequency with which certain educational technologies have been implemented. They have not, however, attempted to make sense of experiences with the implementation of educational strategies that are technology dependent or driven.

This research underscores experiences with ITAEP in PT curriculums. Findings of this study can benefit faculty, higher education administrators, and students. Baumgartner (2012) asserts that technology offers opportunities to support cognition and achievement in PT curricula. Data on faculty experiences can identify the extent to which technology has leveraged these opportunities, or prompted faculty to view technological facilitation of learning in multiple ways. Such data also has the potential to inform administration on issues relating to budget management, institutional development, and ethical practice. Most notably, qualitative findings are of great value to this researcher. An increased understanding of faculty experiences, inclusive
of insights and challenges, can enhance personal efforts in course and program design, and curriculum leadership.

Significance

This study contributes to the advancement of physical therapy education on both a theoretical and practical level. A qualitative interpretative phenomenological approach was able to delve into faculty narratives in a way that helped make sense of personal experiences (Smith & Osborn, 2007), including how the process of transformative learning shapes the integration of ITAEP into a PT curriculum. Through the lens of transformative learning, perspectives, that are expressed as points of view through with meaning making is filtered (McQuiggan, 2012), were revealed during interviews. Deriving meaning from faculty experiences assisted this researcher in analyzing the influence, contribution, and perceived value of ITAEP in PT education, as well as the challenges that accompany the integration of these innovative practices. Furthermore, an exploration of the problem of practice through the lens of transformative learning helped to establish the importance of this theory in research that investigates professional experiences on an individual level.

Data that was analyzed to make sense of faculty experiences adds to existing literature that discusses faculty use and adoption of ITAEP. This data benefits educational practice is several ways. An interpretative phenomenological approach was able to uncover individual insights that can help guide curricular development at the site being studied, and foster critical analysis about quality pedagogy. Additionally, the results of this research, taken from faculty members at a large and diverse campus, can help foster improvement in physical therapy departments nationwide. Qualitative findings that highlight faculty voices can also help develop avenues for future studies or initiatives. Nworie (2014) asserts that many worthwhile innovations
generated through grant-funded projects lack the institutional mechanisms for sustainability, and therefore tend to be short lived and isolated. Participant responses, which may reveal insights into some of these innovations, can open the door to discussion on topics that warrant further exploration. Finally, this research can serve as a reference to organizations such as the American Physical Therapy Association (APTA), an individual membership organization that represents physical therapists (American Physical Therapy Association, 2014), as they work to advance educational initiatives that emphasize complex problem solving, and prepare DPT students to become autonomous practitioners of choice. (Foord-May, 2006; Massey, 2003; Sullivan et al., 2011).

**Research Question**

The following central research question guided this study:

> How do physical therapy program faculty make sense of their lived experiences integrating technology assisted educational practices into the didactic component of their curriculums?

**Theoretical Framework- The Theory of Transformative Learning**

To guide the inquiry of this doctoral thesis project, Mezirow's work on critical reflection and transformative learning was used as a framework. The transformative learning theory, originally introduced by John Mezirow in 1978 (Kitchenham, 2008), is a comprehensive theory of adult learning that has evolved through an integration of ideas from philosophy, sociology, and psychology. (Dirkx, 1998). It is has its roots in constructivism, an interpretive framework which maintains that meaning exists within us (McQuiggan, 2012), and is constructed from our own experiences (McQuiggan, 2012; Schols, 2012).
Mezirow (1997) defined transformative learning quite succinctly as “the process of effecting change in a frame of reference,” (p.5). The process itself, however, is complex and multidimensional. It has been described as one consisting of several steps. Transformative learning begins with a disorienting dilemma that leads to a self-examination of assumptions, a subsequent sharing of thoughts with others, an exploration of new roles and actions, a trying on of new roles, and a reintegration dictated by a new perspective. It has been explained in the literature as a process of perspective transformation, or the examination, inquiry, validation, and revision of perspectives. It is a process that is therefore based on personal experience and frames of reference, and one that spirals upward to include critical reflection, and personal development (Dirkx, 1998; Kitchenham, 2008; McQuiggan, 2012; Mezirow, 1997).

**Philosophical origins of transformative learning.**

Mezirow’s model is largely influenced by the works of adult educator Paolo Freire and German philosopher Jurgen Habermas (Chu, Chu, Weng, Tsai, & Lin, 2012; Dirkx, 1998; Kitchenham, 2008). Freire asserted that learners must develop a critical consciousness of their world, and learn to think in a way that can transform personal, social, and political reality. He viewed learning as a process of liberation from oppression, guided by reflection and dialogue. Though Freire’s influence on Mezirow is evident, Mezirow further developed his theory by characterizing adult learning as a process that is grounded in cognitive and developmental psychology. For Mezirow, this process is comprehensive, goes beyond finding a voice with which to construct meaning, and encompasses the belief that learning gives rise to an individual perception of the world that is inclusive and holistic (Dirkx, 1998; Kitchenham, 2008).

Habermas’ domains of knowledge were equally influential in informing Mezirow’s model. Habermas proposed three types of knowledge interests: technical, practical, and
emancipatory. The first refers to humans’ concerns about gaining control of their world through instrumental rationality, the second, to understanding of society by means of interaction to conquer hermeneutical conflicts, and the third, to deviation into autonomy and responsibility from the power derived by the efforts of labor and interaction (Chu et al., 2012). While the technical interest assumes a positivist orientation, or one of a single reality that exists beyond ourselves (Creswell, 2013), practical and emancipatory interests are constructivist. In Mezirow’s model, these three interests were modified as technical, dialectical, and emancipatory learning. Technical and dialectical learning respectively assert that human beings learn to control and manipulate their environment through task orientation and problem solving derived from technical knowledge, and that interactions and communication with others leads to a greater understanding of their social environment (Chu, et al., 2012). Emancipatory learning forms the essence of transformative learning and states that through reflective thinking and discourse, people challenge and re-evaluate their assumptions, develop alternative ways of interpreting feelings, and engage in new courses of action (Mezirow, 1991). Thus, learning is developmental, and in its latter and most mature stage, prompts an exploration into the psychological dimensions of transformative thought.

**Psychological dimensions: frames of reference.**

Frames of reference are constructed from our personal history of experiences (McQuiggan, 2012). A frame of reference, with cognitive, emotional, and conative components, is composed of habits of mind and points of view, the latter being an expression of the former. Habits of mind, shaped in part by cultural assimilation and influence of primary caregivers, are broad and abstract ways of thinking, feeling, and acting, influenced by assumptions that constitute a set of codes. Habits of mind may result in a predisposition to regard someone or
something different in a certain light, while resultant points of view represent the complex beliefs, judgments, interpretations, values, and attitudes we have about certain individuals or groups. Points of view are subject to continuing change, and accessible to feedback from others (McQuiggan, 2012; Mezirow, 1997).

**Psychological dimensions: critical reflection.**

Both habits of mind and points of view can be cultivated and altered by the construction of meaning from life experiences (McQuiggan, 2012; Mezirow, 1997). Frames of reference are transformed through the process of critical reflection, a cognitive process by which individuals question knowledge and strategy as well as underlying beliefs and assumptions, and strive to make sense of a new experience (Sargeant, 2009; Schols, 2012). Through the lens of transformative learning, this process is characterized as one of content reflection, process reflection and premise reflection (Kitchenham, 2008; Schols, 2012). Through critical reflection, four types of learning can take place. Individuals may 1.) add to an existing frame of reference, and elaborate, or expand the intensity of an existing point of view, 2.) establish new points of view 3.) transform our point or view, or, less commonly, 4.) transform our habits of mind by becoming aware of out generalized bias (McQuiggan, 2012; Mezirow, 1997).

**Psychological dimensions: personal development.**

The intended outcome of critical reflection is individual development. Meaning making elicited through critical reflection has the capacity to create perspective transformation that is permanent, and indicative of a new level of understanding. Transformative learning shapes people in such a way that the changes they experience through the process of reflection and discourse results in new and recognizable modes of interacting with others (Sargeant, 2009). Communicative learning and critical reflection has the potential to foster autonomous,
responsible thinking, which is essential for full citizenship in democracy, and important for full and effective participation in the contemporary professional workplace (Mezirow, 1997).

While criticisms of Mezirow’s theory include a failure to emphasize emotional and spiritual variables as crucial to the process of transformation (Dirkx, 1998), the robustness of his work is nevertheless well recognized in many disciplines. Additionally, the theoretical and practical implications of the theory have been addressed in many scholarly publications, and brought forth for discussion at several international conferences (Kitchenham, 2008).

**Applicability to research.**

Mezirow's theory, which highlights the ongoing cognitive process and personal development that individuals experience when faced with new challenges, was the focus on inquiry for the healthcare professionals in this research, as they reflected on, and worked to make sense of, their experiences. Interview questions captured the ways in which new frames of reference, critical reflection, and perspective transformation have influenced faculty integration of ITAEP into their curriculums. Sense making emanated from questions centered on experiences, beliefs, attitudes, and values about teaching and technology in PT education. Responses to these questions sought to make meaning of the extent to which critical reflection or emancipatory learning have taken place among interviewees, and how these processes helped drive integration of ITAEP. It was the ultimate goal of this researcher to gain insight into how the process of transformative learning has guided and reformed teaching practice among PT faculty.

As a constructivist framework that is firmly situated in the literature of adult learning and development (Dirkx, 1998; Mezirow, 1997), the theory of transformative learning offered a sound conceptual basis for this research. Constructivism is often manifest in phenomenological
studies, as it focuses upon subjective meanings at the individual level, and asks participants to seek an understanding of the world in which they work (Creswell, 2013; McQuiggan, 2012). The exploration of faculty experiences with the integration of ITAEP, through a theoretical lens that views faculty as learners, presented this researcher with an opportunity to assess several dimensions of personal growth, and illuminated the ways in which professionals make sense of workplace challenges.
Chapter 2- Literature Review

This review presents strands of literature that relate to innovative technology-assisted educational practice (ITAEP) in physical therapy (PT) education, and faculty adoption of instructional technologies. Faculty integration of ITAEP has been deemed one of the most important issues facing 21st century higher education (Annan, 2008; Blakely, 2015), is a clear initiative in entry-level physical therapy programs, and gives rise to experiences that are worthy of exploration. In entry-level physical therapy programs, the didactic portion of the curriculum is driven by the challenges of contemporary physical therapist practice settings, and delivered under multiple methodologies (Anderson & Tunney, 2014; Sullivan et al., 2011). Some faculty members are only beginning to integrate technology into teaching, and for many, the decision to adopt certain pedagogical practices is positively or negatively influenced by life and professional experiences (McQuiggan, 2012). However, if ITAEP are not embedded into PT education, young graduates will be unable to meet the demands of a profession that seeks to have a key role in health care reform (Sullivan et al., 2011).

To guide research on faculty lived experiences integrating ITAEP into a physical therapy curriculum, the following areas of literature were investigated:

1. Faculty Integration of Technology in Educational Practice: Influential Factors, including:
   a. internal factors: faculty perspectives, b. internal factors: faculty characteristics, and c. external factors.

2. ITAEP in Physical therapy education: Considerations, including: professional organizations, evidence, guidelines for best practice in PT education, and the institution.
3. ITAEP in physical therapy and health professions: Current Trends, including: a. video based teaching, b. personal response systems, c. high fidelity human simulation, d. Online interaction and collaboration, and e. virtual reality in interprofessional education.

This review was organized to funnel literature through a framework that highlighted the significance and enhanced the understanding of this author’s research. Insights gained through this review helped to establish justification for further investigation into the research topic through the theoretical framework of transformative learning. In keeping with a description of innovation as something new and different relevant to its unit of adoption (Nworie, 2014), and with respect to studies that examine or explore innovative educational practices or faculty use of those practices, only literature that has been published within the past ten years was included in this review.

**Faculty Integration of Technology in Educational Practice: Influential Factors**

Decisions pertaining to course delivery modes in higher education are often made by administrators and driven by politicians, (Brinthaupt, Clayton, Draude, & Calahan, 2014; Reeves & Reeves, 2008), however, initiatives to integrate teaching tools and strategies into curricula usually rest with the faculty who teach the courses (Osika et al., 2009). These initiatives may be influenced by a number of factors, which can be characterized as internal, or emanating from within an individual, or external, or out of immediate control of an individual (Osika et al., 2009; Ryan & Begley, 2015). Internal factors include faculty perspectives and characteristics, while external factors include variables relating to professional responsibility and institutional support (Annan, 2008; Kazley et al., 2013; Keengwe et al., 2009; Osika et al., 2009).
**Internal factors: faculty perspectives.**

Both qualitative and quantitative measures have been used to look at faculty perspectives regarding the contribution of ITAEP to higher education. Given the struggle that exists between the propensity of technologies to define their own paths, and faculty desire to align new innovations with the values and traditions of the academies in which they teach (Reeves, & Reeves, 2008), it is important to investigate the factors that shape instructor points of view.

The most significant internal factors affecting integration of ITAEP in any educational setting are individual feelings, beliefs, and attitudes regarding technology and education, and the relationship between the two (Blakely, 2105; Osika et al., 2009; Ryan & Begley, 2015). Phenomenological inquiry has revealed that faculty confidence can be compromised with technology integration (Blakely, 2015). Qualitative research also asserts that anxiety is often experienced among faculty who are transitioning to innovative methodologies (Freed, Bertram, & McLaughlin, 2013). In a mixed methods study that analyzed survey and focus group data from students and faculty in a college of health professions, results indicated that faculty belief regarding the potential of technology to enhance educational delivery was a major factor contributing to the adoption of technology in teaching (Kazley et al., 2013). Similarly, in phase one of a mixed method study that sought to investigate the factors that motivate faculty to accept educational technologies, the authors concluded that the ability for these technologies to contribute to overall quality of teaching was very important to acceptance (Salajan, Welch, & Ray, 2011). This viewpoint was equally evident in data that looked at faculty perspectives in online teaching and discovered that 89% of faculty were using discussion forums, based, in part, on a perception that they positively build student to student interactions and promote good communication skills (Santilli & Beck, 2005).
Not all faculty members perceive ITAEP positively. Some faculty feel that online activities reduce spontaneity in conversations, and do not provide an adequate substitute for the sensory and expressive relationships that are established in face to face classrooms (Major, 2010). In a study that looked at the nature and extent of technology use in PT education, Baumgartner (2012) reported limited use of technology to deliver instructional content. Additional literature suggests that innovative technologies may erode professional control, and dehumanize teaching and learning (Johnson, 2012; Ryan & Begley, 2015). In a large scale, peer-reviewed inquiry by Johnson (2012), that qualitatively analyzed 42 interview responses, it was discovered that members of the professoriate perceived the adoption of certain technologies as a managerial attempt to control the work of faculty. Furthermore, some academics perceived instructional technologies to be ineffective, limited in pedagogical value, and in some cases, a substitute for understanding fundamental components of analysis, and therefore detrimental to student learning.

Additionally significant in the adoption of ITAEP into curricula are faculty feelings and attitudes regarding their role as teachers, and how these are affected by technology. During online activities, instruction shifts from being teacher centered to being student centered (McQuiggan, 2012; O’Neill, Scott, & Conboy, 2011). Even in face-to-face technologically mediated classrooms, the instructor may no longer be the primary source or disseminator of information, but rather, a guide or facilitator in the learning process (McFalls, 2013). This role reversal may be unsettling for some faculty who feel that their position is being reduced, or that their roles are interchangeable with that of the student (Ryan & Begley, 2015).

Conversely, some studies show that taking on a facilitative role has positive consequences for faculty and encourages them to adopt technology in their teaching. Major
(2010), through interpretive metaethnography that explored faculty experiences with online education, discovered that facilitation roles allowed faculty increased opportunities for instructional design in their courses, afforded them ability to get to know their students better, and offered them a “sense of intellectual challenge” (p.12). McQuiggan (2012) asserted that online teaching, bolstered by professional development activities, allowed faculty to become more flexible and follow a more productive, constructivist philosophy toward teaching and learning. Similarly, in a study designed to learn about student and faculty perceptions of a flipped classroom format, analysis of open ended faculty responses indicated that in using this approach, instructors were better able to assess critical thinking (Young et al., 2014).

The adoption of innovative practices is partially contingent upon faculty awareness of how to use certain technologies. A quantitative, survey based study, partially designed to assess faculty awareness of web 2.0 technologies, revealed that while 47% of faculty participants felt that the use of wikis would improve learning, and 42% felt that blogs would do the same, these technologies were not widely used in their courses. This study also sought to investigate factors that influence adoption of technologies, and found that technology integration rests not only on its perceived usefulness, but its perceived ease of use as well (Ajjan & Hartshorne, 2008).

**Internal factors: faculty characteristics.**

In addition to the individual perspectives that may underpin decisions regarding integration of ITAEP, other internal factors can promote or inhibit technology use. These include comfort level with technology implementation, individual innovativeness, and the need for a sound rationale that ties the appropriateness of the technology to course material (Annan, 2008; Baumgartner, 2012; Kazley et al., 2013; Ryan & Begley, 2015).
To best understand technology adoption, it is worthwhile to look to Rogers’ diffusions of innovations theory as a conceptual guide. This theoretical framework states that innovation occurs in five stages: knowledge, persuasion, decision, implementation, and confirmation (Annan, 2008; Ryan & Bagley, 2015). An inability to move through these stages can result when specific internal barriers exist. For example, a faculty member who cannot move past the knowledge stage (stage 1) may lack general computer capabilities and skills (Ryan & Bagley, 2105). Faculty who lack these skills generally have a decreased comfort level with technology, which may be coupled by a decreased desire to learn more about technological interfaces (Kazley et al., 2013). The overall result is less integration of ITAEP into the education process.

Individual innovativeness describes a component of the diffusion of innovations theory that categorizes individuals based upon the likelihood that they will adopt an innovation. Categories of adopters include innovators, or venturesome individuals, early adopters, or opinion leaders, early majority, or connectors, late majority, or skeptics, and laggards, or those who resist change (Annan, 2008). Kazley et al., (2013) posits that mainstream faculty generally do not fall into the first two categories of adopters, and that they need a compelling reason to consider early adoption of technology.

Faculty who will not implement a practice without supportive data find themselves in the persuasion and decision stages of technology adoption for longer periods of time. In a study that examined the factors that influence collaborative learning in distance education, O’Neill et al. (2011) discovered that the adoption of an educational approach is influenced by the need to establish an appropriate rationale for its use. This was apparent in the authors’ data, which found that high efficacy ratings of instructional technologies corresponded with participant use. With evidence that online discussion forums and online collaborative document tools positively
influence learning efforts, these platforms were used, respectively, by 100% and 78% of faculty members surveyed.

While it is prudent to turn to the literature for guidance on issues of technology integration, it is important to consider the rapid rate at which technology changes (Kazley et al., 2013), and how that affects the ongoing process of determining efficacy and appropriateness of interventions. This continual need for assessment can create struggles for faculty members seeking to identify worthwhile practices that can enhance the educational experience.

**External factors.**

Investments in time, training, and organizational support are some external variables that can affect faculty implementation of ITAEP. With respect to online activities, faculty report increases in the amount of time spent providing individual feedback on assignments such as student journals (Major, 2010), or developing and implementing modules for document sharing (Pittinger & Olson-Kellogg, 2012; Rowe et al., 2013). Additionally, practices such as classroom flipping, or video based learning, require significantly more preparation time for first time delivery. (Mclaughlin et al., 2013; Moore & Smith, 2012). Furthermore, additional professional responsibilities, such as committee work, public service projects, or research activities, which help facilitate promotion or acquisition of tenure, may result in faculty simply not having the time or interest to learn about new instructional technologies (Annan, 2008).

Competency and comfort levels can be influenced by lack of training, an external barrier that is most prevalent among faculty who have been teaching for ten or more years (Osika et al., 2009). A qualitative exploration of the factors affecting adoption of technology to teaching and learning revealed that training is critical to the integration process, and must be readily available and accessible (Keengwe, Kidd, & Kyei-Blankson, 2009). Additionally, training must move
beyond teaching a technological tool, to educating faculty on how to make that tool pedagogically useful (Keengwe et al., 2009; Ryan & Bagley, 2015). Furthermore, there is a recognized need for professional development that views faculty as adult learners, and considers prior knowledge and experience that is instrumental in shaping perspectives. (McQuiggan, 2012). Literature suggests that professional development can actually be a potential answer to both internal and external barriers to technology integration, if conducted in such a way that it is individualized to the needs of the faculty trainee, and presented by using different approaches that encourage personal growth (Ryan & Bagley, 2015).

Narrative data collected by Keengwe et al. (2009), indicated that faculty are more likely to use technology if they have departmental and peer support, and if opportunities for cross collaboration with other faculty exist. In a quantitative survey analysis, Osika et al (2009), found that 36% of faculty reported that problems with institutional infrastructure would negatively influence their decisions to use technology. Data gathered from a mixed methods study, conducted at a college of health professions, showed that faculty barriers to technology adoption include organizational support and culture. The authors claimed that a successful organizational culture is one that supports the inclusion of faculty in policy and planning discussions related to technology use, and advocates for peer support (Kazley et al., 2013).

Literature underscores the need to make connections between the adoption of ITAEP and the values of the institution. The integration of technologies into educational practice must begin with a sound vision about organizational learning objectives. Integration of educational technology should be aligned with institutional mission, and support for educational technologies outlined in a long-term strategic plan. It is additionally important, as part of the planning process,
that policies and procedures relating to the adoption of a particular technology are developed (Annan, 2008; Keenwge et al., 2009; Osika et al., 2009).

While greatly impacted by internal factors, decisions to adopt or exclude technologies in educational practice are based on a number of variables. For this reason, it is incumbent upon higher education administrators to nurture the development of technology-assisted practice in a way that empowers, supports and promotes transformative learning among faculty (Blakely, 2015; Ryan & Begley, 2015).

**ITAEP in Physical Therapy Education: Considerations**

The physical therapy profession appears to lack signature pedagogy in the didactic phase of PT education (Anderson & Tunney, 2014). The integration of ITAEP into PT curricula has, however, been identified as one method of enhancing the scholarship of teaching and learning in PT programs, and has been accompanied by recommendations to incorporate technologies that contribute to clinical decision making skills among PT students (Anderson & Tunney, 2014; Baumgartner, 2012). While these recommendations are valuable, the inclusion of technology-assisted practices may ultimately be influenced by more compelling forces such as professional organizations, published literature, guidelines for best practice, and the larger institution.

**Professional organizations.**

Nationally, all entry-level physical therapy education programs must be approved by The Commission on Accreditation in Physical Therapy Education (CAPTE), a non-governmental accrediting agency that is recognized by the United States Department of Education (USDE), and the Council for Higher Education Accreditation (CHEA)(Commission for Accreditation in Physical Therapy Education, 2014). Though recognized as an independent agency, CAPTE is under the auspices of the American Physical Therapy Association (APTA), a professional
organization whose initiatives are to advance physical therapist education, practice, and research, and to promote a vision of transforming society by optimizing movement to improve the human experience (American Physical Therapy Association, 2014). This current vision succeeds and was influenced by a much more extensive vision that was termed “Vision 2020,” and adopted by the APTA house of delegates in the year 2000 (American Physical Therapy Association, 2014c). Vision 2020 states that by the year 2020, physical therapy services will be provided by doctors of physical therapy who are autonomous practitioners, and recognized as practitioners of choice for intervention and prevention of impairments, functional limitations, and disabilities related to movement, function, and health (American Physical Therapy Association, 2014b; Moore & Smith, 2012; Veneri, 2011). It was this comprehensive vision that served as the driving force for many changes that were made to PT education, and prompted CAPTE to propose standards that would require programs to include a variety of effective instructional methods in curriculums, and ensure that distance education methods were effective (Commission for Accreditation in Physical Therapy Education, 2014).

It was also vision 2020 that impelled the APTA to form an Education Strategic Plan, with 18 overall goals set forth to advance physical therapy education. Of the 18 goals established, the 13th focuses on technology and asks programs to “collaborate with others to develop customized software/hardware applications and medical computer simulations to enhance on-site and distance education” (Veneri, 2011, p.288). Furthermore, vision 2020 and related CAPTE requirements have sparked a surge in interprofessional education (IPE), an approach to teaching in which students from two or more professions learn about, from, and with each other (Sargeant, 2009; Vouri et al., 2013). IPE requires scheduling across multiple professional schools and sites,
and frequently depends upon technology to establish interactions and reduce barriers with respect to time, space, and location (Seefeldt et al., 2012; Vouri et al., 2013).

In addition to APTA and CAPTE initiatives, the national public health agenda known as Healthy People 2020 (HP2020) serves as an impetus for PT faculty to re-examine their curriculums and expand pedagogical content. With a focus on improving the health of all Americans, HP2020 provides opportunities for PT’s to provide primary care that includes rehabilitation, disease mitigation, and health promotion (Sullivan et al., 2011). In order to meet the demands that society will make on the PT profession, instructors will need to employ multiple strategies that advance in depth learning, and prepare current students to become future educators.

Evidence.

Measures proposed by the APTA and CAPTE have been and continue to be concurrent with emergent evidence that discusses the value of ITAEP throughout higher education curricula. Lautenbach (2014) asserts that 21st century learning, which emphasizes communication across cultures and critical thinking, can be achieved with the integration of technologies such as interactive documents and access to online personal learning networks that embellish personal projects. Veletsianos (2011) posits that the use of emerging technologies can advance social constructivism, create inspiring learning experiences, and allow educators to set high level objectives that enable students to reach higher level outcomes. Through the construction of online communities of practice that allow students to be both mentees and contributors, educational practice becomes richer, and experiences more fulfilling.

Contemporary research has supported technology integration. Chu, Siu, Liang, Capio, & Wu (2011), conducted a mixed method study, with an intent to examine student perceptions of
wikis in computer supported environments. Wikis, or collaborative, online documents that allow multiple authors to access, contribute to, and edit pages jointly, are a function of Web 2.0 software, a second generation of the world wide web that is focused on information sharing (Chu et al., 2011; Ioannou, Brown, & Artino, 2015). Through mixed methods, the authors concluded that wikis fostered group collaboration, enhanced knowledge construction, and promoted active learning.

Research has additionally focused on the value of online collaborative learning through a course discussion forum. A discussion forum can be defined as a text based, computer mediated communication that allows human-human interaction without time and location constraints (Maddix, 2012). Comer & Lenaghan (2013) found that through a process of applying personal experiences to course contents, as well as analyzing and evaluating peer discussion board posts, 88% of students surveyed reported learning as much through online coursework as through face-to-face learning.

**Guidelines for best practice in PT education.**

Educational practice recommendations put forth by CAPTE, such as case-based or problem based learning, along with contemporary conceptual models that emphasize evidence as integral to the teaching of clinical intervention strategies, have been prominent in the literature on PT education (Anderson & Tunney, 2014; Darrah, Loomis, Manns, Norton, & May, 2006). Additionally, practices that focus on collaborative learning through interprofessional education and utilization of active learning principles through facilitated group activities, have been highlighted in recent studies. It has been suggested that these types of strategies should be more visible in curricula, and that traditional presentations should comprise only a piece of content delivery (Nelson-Wong, Eigsti, Hammerich, & Ellison, 2013; Sargeant, 2009). While
technology has the potential to facilitate the implementation of these recommended educational strategies, and thereby enrich learning, the extent to which it is integrated by faculty members may depend upon individual habits of mind.

Problem-based learning (PBL) is guided by several tenets, including: a change in faculty role from expert lecturer to facilitator, an emphasis on student responsibility and self-directed learning, learning in small groups, and a written problem as the stimulus for learning (Solomon, 2005). Problems that are presented to students are designed to elicit a process that results in co-construction of knowledge among group members (McAllister et al., 2014). In PT education, PBL often uses clinical scenarios to address educational objectives, and embedded within PBL is evidence-based decision making, which requires students to come to conclusions based on the findings of high quality, relevant research (Castro-Sanchez et al., 2012; Foord-May, 2006). Proponents of PBL assert that this method improves retention of information, increases the ability to apply information in clinical contexts, and helps develop skills of lifelong learning (Foord-May, 2006).

Given its ability to reduce healthcare costs, improve patient outcomes, promote person-centered communication, and bolster collaboration among health care professionals, IPE has become a growing priority in health professions education (Cavanaugh & Konrad, 2012; Sargeant, 2009; Ward, 2012). This educational strategy advances the principles of both the social psychology and complexity theories, which respectively assert that situational factors influence behavior, and that the combined components of complex systems are more important than the discrete actions of individuals (Sargeant, 2009). It is a practice that provides students opportunities to develop the knowledge, skills, and behaviors necessary for collaboration, consider new perspectives, and question previously held assumptions (Mohaupt et al., 2012).
Approaches to IPE vary, and research has supported the efficacy of face-to-face interprofessional simulation in enhancing student understanding of professional roles (Cavanaugh & Konrad, 2012; Mohaupt et al., 2012). Implementation of IPE requires careful deliberation and planning, and can be resource intensive with regard to space and time (Shoemaker, Platko, Cleghorn, & Booth, 2014).

Active learning techniques enable students to process information while integrating and applying information learned to solve problems (Ruckert, Plack, & Maring, 2014). They are manifest in both PBL and IPE, and call for less time devoted to traditional, instructor-led lecture, and more time spent on student centered discussion and experiential learning activities (Missildine, Fountain, Summers, & Gosselin, 2013; Ruckert, et al., 2014). Examples of active learning in PT education include role-playing, performance of psychomotor skills, and problem solving video case scenarios (Ruckert, et al., 2014). Active learning strategies are often inclusive of pre-class activities, and serve as the underpinnings for flipped or inverted classrooms, which use contemporary technological resources including, but not limited to, audio narrated lectures, video, and discussion forums to move foundational course content online, and allow for more fruitful interactions during class time (Baumgartner, 2012; McLaughlin et al., 2014; Ruckert et al., 2014). The constructivist concept of flipping the classroom endeavors to engender higher level thinking and problem solving among students, and considerable discussion has been generated about its potential efficacy to better prepare health professions students for the 21st century workforce (Hawks, 2014, McLaughlin et al., 2013). Research on academic performance in flipped classrooms is promising, with reports of higher exam scores in flipped versus traditional nursing courses (Missildine et al., 2013), and evidence of exams among medical
students in a flipped classroom showing scores up to 12 percentage points higher in certain instructional modules (Tune, Storek, & Basile, 2013).

A continued emphasis upon faculty live demonstration of procedures and interventions, followed by guided practice and performance by students, remains a priority in PT education (Anderson & Tunney, 2014). With PT programs focused on the preparation of practitioners that evaluate and treat movement dysfunction across the lifespan, it is imperative that students are competent in the execution of manual therapy techniques (Anderson & Tunney, 2014; Ruckert et al., 2014), and comfortable with hands-on examination and treatment approaches.

The institution.

Driven by best pedagogical practice, but influenced by external forces, are institutional and departmental goals that seek to advance the mission of 21st century higher education and advocate for technology integration. To be a thriving university in today’s society, and to prepare students for the workplace of the future, technology integration is crucial throughout all schools and programs (Kumar, 2009; Osika et al., 2009; Spanier, 2010). As of 2010, higher education online enrollments eclipsed face-to-face enrollments by more than 10%, and 20% of all postsecondary students were taking at least one online class (Anderson, Maier, & Shepard, 2010). Currently, 89% of colleges and universities in the US offer opportunities for online learning (Barr, 2014). While this shift in course delivery mode is fueled by a desire for higher education institutions to remain competitive with one another, it is also deemed necessary in a society where information technology will become increasingly important as institutions move away from industrial age educational practice (Nworie, 2014; Spanier, 2010).

Factors that either support, encourage, or lead to discussion about ITAEP must be carefully considered, as not every technology application to instruction is suitable for academia,
or aligned with theories of learning (Nworie, 2014; Rowe, Bozalek, & Frantz, 2013). To most effectively assess PT faculty experiences with ITAEP, it is important to further investigate studies that focus on the contribution of pedagogical innovations to PT or healthcare curriculums, as published research may affect faculty perspectives, and better help this researcher understand lived experiences.

**ITAEP in Physical Therapy and Health Professions Curriculums: Current Trends**

The use of technologies including, but not limited to, videoconferencing, podcasting, personal response systems, document sharing, presentation programs and discussion platforms, digital tablets, and virtual reality systems, have been used in face to face, hybrid, or online blended with face-to-face instruction (Carbonaro et al., 2008), and distance education courses. In any setting, the goal of ITAEP is to facilitate opportunities for individualized, interactive, and experiential student centered learning (Ajjan & Hartshorne, 2008; Baumgartner, 2012).

**Video based learning.**

Videography has been used traditionally in health professions education to supplement classroom activities (Moore & Smith, 2012), amidst evidence that video-based learning has the potential to provide opportunities for knowledge construction, flexibility, and self-paced learning (Moore & Smith, 2012; Smith et al., 2006b; Weeks & Horan, 2013). Over the past decade, scholars have developed new paths of inquiry, as innovative practices have been introduced into several studies that have sought to determine the efficacy of supplanting, rather than supplementing, course content with various forms of video instruction (Moore & Smith, 2012; Nogueira et al., 2013; Veneri, 2011). Much of this inquiry has also centered on the contribution of video-based teaching to the development of the psychomotor skills that are crucial for PT students.
The concept of using video as primary means of delivering course content has been the focus of several studies in PT education within the past decade. Ford, Mazzone, & Taylor (2005), in a quantitative, experimental study, confirmed their hypothesis that computer assisted digital video would be as effective as live demonstration in the acquisition and retention of psychomotor skills. The following year, during a lesson on manual techniques at the knee and ankle, Smith et al., (2006a) compared the use CD ROM with live demonstration, and found both teaching modalities to be equally effective. When the same authors used a similar research design to determine whether learning styles affected the influence of instructional strategies on cognitive and psychomotor performance in PT students, results showed that dominant learning styles was not a variable (Smith et al., 2006b).

Mixed method research conducted by Jones, Dean, & Chan (2010), examined the effects of video conferencing on learning. Video conferencing refers to the linking of two or more sites, such that people are able to interact across sites via video through the internet (p. 1193). Objective test scores revealed that video linked tutorials, in combination with web based tutorials, appeared pedagogically comparable to conventional formats. These results are similar to those obtained by Moore & Smith (2012), who compared the effectiveness of video podcasting to live demonstration for teaching basic therapeutic handling skills, and found no significant difference between the two. Podcasting, a newer form of digital media, refers to the distribution of audio or video files via the Internet that can be accessed from computers or handheld devices. Along with innovations such as 3 dimensional mobile applications, podcasts highlight the capability of handheld devices to serve as vehicles for teaching and learning. This capability was further realized in a study conducted by Noguera et al., (2013), who used quantitative outcome measures to assess the efficacy of mobile applications installed in i-pod
touch devices, and determined that these 3D applications could elicit an increase in learning of up to 25%.

Qualitative and quantitative student feedback on the use of video is noteworthy. Though students indicated that they found videos helpful, they did not consider videos superior to or more interesting than live demonstration. Additionally, video based instruction was not rated as the preferred method of learning among participants (Jones et al., 2010; Moore & Smith, 2012; Noguera et al., 2013).

**Use of personal response systems.**

Personal response systems (PRS) are also categorized in the literature as audience response systems, clickers, electronic response systems, or zappers, (Keogh & Wang, 2010; Mincer & Thompson, 2012). They first evolved several decades ago, but have only been used extensively since 2003, after a new generation of more affordable infrared PRS were introduced (Kay & LeSage, 2009; Mincer & Thompson, 2012). PRS have traditionally consisted of small remote handsets, used by students to send wireless signals to a receiving computer, which then tabulates responses to questions, and graphically displays results on an LCD projector (Kay & LeSage, 2009; Keogh & Wang, 2010; Mincer & Thompson, 2012; Nightingale, 2010). In recent years, lecture software, which promotes classroom discussion through laptops, tablets, or smartphones, has successfully replaced the need for handsets in many environments (Green, Chang, Tanford, & Moll, 2015). Overall, PRS have elicited positive effects upon student engagement, attendance, interaction, and achievement, and have been viewed favorably by students who feel that this system allows them to participate freely in class without recrimination (Gauci, Dantas, Williams, & Kemm, 2009; Kay & LeSage, 2009; Keogh & Wang, 2010; Revell & McCurry, 2010).
Student attitudes toward PRS have been well documented, with perceptions that PRS in science based classrooms increase critical thinking and motivation to think, help create an intellectually stimulating environment and sustain attention, provide quality feedback, and enable concepts from different classes to be integrated (FitzPatrick, Finn, & Campisi, 2011; Gauci et al., 2007; Mincer & Thompson, 2012; Revell & McCurry, 2010). Faculty attitudes, which have been addressed to a smaller degree in the literature, have revealed that student engagement with the use of PRS was increased (Keogh & Wang, 2010).

The pedagogical value of PRS has been measured through quantitative studies that have compared exam grades from different cohorts of students in science and health science curriculums. Gauci et al., (2007) demonstrated that both midterm and final exam scores improved by up to 6 percentage points in a cohort of science students using PRS’s. Similarly, Fitzpatrick et al, (2011), found that in select health science courses, exam scores among PRS users was higher.

Though these studies are compelling, concerns have been raised about the quality of questions used when implementing PRS technology. To give rise to higher order thinking and improve learning outcomes, the right questions must be posed. In the absence of meaningful questions, the incorporation of PRS can be seen simply as the use of technology for technology’s sake (Mincer & Thompson, 2012).

**High fidelity human simulation.**

High fidelity human simulation (HFHS) uses computerized, whole body manikins, situated in controlled but realistic clinical learning environments, to mimic realistic patient scenarios that provide authentic opportunities for experiential learning. In health care simulation, fidelity refers to how closely the simulator reproduces patient and environmental characteristics,
therefore, high fidelity manikins are able to simulate real-time changes in various aspects of physiologic functioning, and are often equipped with monitoring and interventional devices that might be encountered in intensive care settings (Ohtake, Lazarus, Schillo, & Rosen, 2013; Shoemaker, Riemersma, & Perkins, 2009). HFHS offers students the ability to practice skills and engage in clinical decision making in a safe, low-risk environment, and has been proven efficacious in medical and nursing education (Silberman, Panzarella, & Melzer, 2012).

Investigation into the use of HFHS in physical therapy education has been reported in the literature since 2009, and has focused primarily on measures of student confidence. In four different studies, the contribution of this practice was examined in simulated acute care or intensive care hospital units (ICU’s). In quantitative research that sought to examine the effects of HFHS on student confidence and perceived preparedness for clinical education, results supported the use of this modality. Silberman et al., (2012) concluded that 91.5% of PT students surveyed after a simulation experience felt greater levels of confidence in interprofessional communication, and 95.2% perceived the experience to be valuable preparation for clinical practice. This concurs with results obtained by Ohtake et al. (2013), who reported a 47% post-simulation increase in student confidence and understanding of critical care procedures, and supports earlier research done by Shoemaker et al., (2009), who asserted that one high fidelity simulation session yielded higher levels of student confidence and enhanced critical thinking skills. In distinct experimental research designed to compare low fidelity simulation performed with standardized patients, or actors trained to simulate illness, to HFHS, Smith, Prybolo, & Conner-Kerr (2012) suggested that both methods were equally effective in improving certain clinical competencies. However, the authors also concluded that participants expressed a strong preference for the high fidelity method of learning.
Though literature on the topic of HFHS supports the use of this practice, the significant cost of constructing a simulation lab may affect the acquisition of HFHS resources (Ohtake, et al., 2013; Shoemaker et al., 2009, Smith et al., 2012). It is possible that the use of standardized patients, in conjunction with software that allows for display of ICU monitoring data, may be viewed as a cost effective alternative. Additionally, the construction of a HFHS lab may only be justified if integrated into several courses (Shoemaker et al., 2009).

**Online interaction and collaboration.**

Current literature underscores the notion that online education is not about the instructional tools that are available, but rather, the teaching and learning opportunities that can emerge with technological integration (Lautenbach, 2015). ITAEP in the online environment should therefore be structured to design novel learner experiences and promote critical thinking, rather than exist to simply reinforce traditional instruction with the efficiency of technological tools (Lautenbach, 2015; Rowe et al., 2013; Veletsianos, 2011). Additionally, online practices should advance the social constructivist concept of collaborative learning, through consensus views obtained by while working, talking, and sharing with others (Boyer, Maher, & Kirkman, 2006).

**Discussion boards.**

Scholarly research maintains that asynchronous discussion boards promote student to student interaction, stimulate dialogue that extends collaborative knowledge construction and critical thinking, and support metacognitive engagement of reasoning (Heejung, Sunghee, & Keol, 2008; Ioannou et al., 2015; Maddix, 2012). Discussion boards are frequently designed around a community of inquiry model, which proposes that online learning occurs as a result of interaction between three elements: cognitive presence, or the extent to which participants co-
construct meaning through discussion posts, social presence, or the ability of participants to project personal characteristics through discussion posts, and teaching presence, or the degree of instructor facilitation within discussion threads (Lee, 2014; Maddix, 2012). Research has shown that high levels of cognitive and social presence contribute to quality discussion posts, while studies on teaching presence have been inconclusive. These conclusion have left instructors with conflicting guidelines on appropriate facilitation practices (Comer & Lenaghan, 2013; Heejung et al., 2008; Lee, 2014).

Research on the use of discussion forums in health professions education has focused on the relationship between discussion board use and cognitive domain higher order thinking, as well as the experience of participation in forums. While results show student experiences in discussion board forums to be positive, they also question the cognitive benefits that can be gained through this methodology. In a study conducted by D’Eon, Proctor, & Reeder (2007), up to 40% of students who participated in a structured discussion board forum, using a small group debate format, felt confident that they experienced enhanced learning. Similar positive feedback was garnered by Miers et al., (2007) in a qualitative analysis performed later the same year. The authors conducted a study, designed, in part, to assess the contribution of discussion board forums to IPE, and found that students benefitted from sharing of professional knowledge and opportunities for peer review while participating in discussion board assignments. In the same study, however, the authors also looked at how discussion board activity contributed to knowledge construction, and found little evidence that students deepened their analytical and evaluative skills. This finding is consistent with that of Linjawi, Walmsley, & Hill (2012), who examined community of inquiry dynamics among dental students, and found little in the way of metacognitive learning.
Interactive documents.

In the past several years, research has illuminated the pedagogical benefits of certain interactive web 2.0 technologies in higher education. Those most prominently discussed in the literature are Google documents, wikis, and blogs. These platforms are noted for their ability to support different aspects of learning, including the development of critical thinking skills, and the enhancement of greater fluency in writing (Iannou et al., 2015; Kumar, 2009).

In PT curriculums, research on web 2.0 technology-assisted strategies is steadily emerging. Within the theoretical framework of authentic learning, which views learning as a whole-task, social experience, Pittinger & Olson-Kellogg (2012) conducted a mixed method study to investigate the extent to which collaborative writing within a wiki facilitated learning assisted in professional development among PT students. Qualitative data revealed that the use of a wiki helped to positively develop the writing skills for diverse audiences, and that the complexity of the learning format helped to foster professional identity. Similar results were found with qualitative research that explored the ability of Google drive to facilitate critical thinking in a PT course that used a case-based learning format. Google drive, a free service from Google with document sharing, presentation, and instant messaging components, allows multiple authors to work together in real time. Through inductive analysis, authors concluded that the features of Google drive enabled students to move toward autonomous learning and in depth analysis of information (Rowe, Bozalek, & Franz, 2013).

Critical reflection allows students to create new meaning from experiences (Dirkx, 1998; Wright & Lundy, 2012). Traditionally, reflective thought has been documented in journals. In today’s world, however, these journals take the form of electronic blogs, or web logs, which can be written individually with feedback from readers, or constructed as a group. In a study that
used qualitative procedures to code data according to Mezirow’s levels of reflective analysis, group blogging among PT students during an experiential learning activity was found to promote reflective thought that offered greater depth of information with the passage of time. The authors concluded that through social constructivist networks, critical reflection led to transformative learning among students, and simultaneously laid the foundation for these learners to develop more sophisticated clinical reasoning skills (Wright & Lundy, 2012).

**Virtual reality in interprofessional education.**

Despite evidence-based support for face-to-face interprofessional collaboration, barriers to traditional methodologies, coupled with the need for rich communication and meaningful synchronous learning experiences, have created the need for educational innovation. Such innovation has included the use of virtual spaces, including the virtual world of Second Life, an online, multiuser, customized virtual environment that includes avatars, or digital versions of users, and allows for real time communication via voice or instant messaging (Sabus, Sabat, & Antonacci, 2011; Seefeldt et al., 2012). In several studies, different authors have asserted that the IPE experience can be enhanced through the use of virtual spaces. A qualitative case report, which included PT student perspectives, highlighted learners’ responses to a virtual patient based activity, and revealed that students more clearly understood different scopes of practice, became more adept at coordinating patient care, and were more confident collaborating with other professionals following this activity (Shoemaker, Platko, Cleghorn, & Booth, 2014). A study by Carbonaro et al., (2008) used a virtual reality system to determine whether interprofessional team process skills could be taught as well in a blended format as in a face-to-face format. With virtual reality replacing a face-to-face component, it was discovered that students who were taught
under a blended methodology were better able to identify personal strengths and weaknesses as part of a team.

Further support for virtual environments in IPE was garnered in two separate studies that both utilized the virtual world of Second Life to facilitate online interaction. Through this interface, interprofessional case discussions were held among physical therapy, occupational therapy, physician assistant, and nursing students. In both studies, authors similarly concluded that the virtual environment was successful in eliciting greater depth of discussion and complex interdisciplinary thought (Sabus et al., 2011; Seefeldt et al., 2012). Additionally, Seefeldt et al., (2012) found that 28% of participants reported an increased ability to see perspectives of other health care professionals.

The use of virtual environments in IPE has been clearly highlighted in the literature. However, it is important to note that other technology facilitated practices such as asynchronous online forums and videoconferencing have been deemed beneficial to IPE as well (Sheldon et al., 2012). Furthermore, HFHS has been cited in the literature as an effective means to prepare future clinicians for meaningful collaborative, interprofessional practice experiences (Murdoch, Bottorff, & McCullough, 2013).

Several interesting factors come to light in a review of literature on current ITAEP in physical therapy and other health professions. While video based education yields clear pedagogical benefits in the domain of psychomotor learning, qualitative feedback on this methodology has also revealed that students value traditional classroom practices. Though studies using PRS in science and health curriculums are promising, several barriers, including cost of handsets, and technology-based issues with devices and receivers, have been reported (FitzPatrick et al., 2011; Kay & LeSage; Keogh & Wang, 2010; Mincer & Thompson, 2012).
HFHS, a practice still in its infancy in PT education, is not yet supported by evidence that addresses educational outcomes. Literature suggests that the efficacy of online practice, prominent in many disciplines throughout higher education, may be dependent upon course content and underlying pedagogical strategy, particularly with respect to how to integrate instructor presence into discussion forums. Virtual environments, while deemed pedagogically beneficial, are also beset by challenges. In one study, 89% of participants reported experiencing technical difficulties with the use of Second Life (Seefeldt et al., 2012). Ultimately, further integration of innovative pedagogical models in PT education can be better achieved if accompanied by insights into how faculty make sense of experiences that relate to these innovations.

**Summary of Literature Review**

A review of the literature was enlightening for several reasons. A number of studies have investigated the internal and external factors that influence integration of technology in higher education. While qualitative data on this topic is emerging, much of that data reflects perspectives on either factors that influence adoption of technologies, the potential of technology to contribute to pedagogy, or specific aspects of instructional technology such as online teaching. This is noteworthy, as additional data that centers on thick, rich descriptions of internal characteristics that help faculty make sense of their lived experiences, appears valuable. Furthermore, deep qualitative insights into the integration perceived of ITAEP as it applies different domains of learning, contributes positively to the literature.

The factors that affect integration of ITAEP into the PT curriculum, though interrelated, are diverse. Though one or more of these factors may impel faculty to integrate ITAEP, there may be other influences that guide decisions on educational practice. An exploration into faculty
sense making ascribes meaning to the process of technology integration, including the factors that drive that process. Additionally, qualitative data collection helps reveal the extent to which faculty perceive alignment between best practice and integration of innovative technologies, and sheds light on how or whether habits of mind and points of view have evolved with exposure to these technologies.

It is significant to note that many of the studies on current trends in technology assisted practice in PT and health professions programs focus on student experiences. While some faculty perspectives were elicited on the effects of PRS in classrooms, data largely focused on student viewpoints, and learning outcomes. Though Moore & Smith (2012) reported significant investments in time to construct podcasts, and Smith et al.,(2006a) commented on extensive faculty preparation required to film customized instructional CD’s for experimental purposes, no instructor perspectives were elicited in these studies. With respect to video based learning, only Noguera, et al., (2010), and Jones et al., (2010) captured data on instructor experiences, and in neither study was this the focus of data collection Likewise, studies conducted on HFHS focused on student confidence, and most studies on interactive documents explored student satisfaction, and perspectives on how web 2.0 technologies impacted student learning. Additionally, no faculty perspectives were gathered with respect to the use of virtual reality or Second Life, in spite of reported technical difficulties with these programs (Seefeldt et al., 2012). Given the investments in time and thought required to ensure successful integration of many contemporary technologies, feedback from instructors who are implementing these strategies appears crucial.

This author’s research explores lived faculty experiences integrating ITAEP into teaching and curriculum. A review of literature validates the importance of such research. There is a paucity of qualitative research that looks at faculty experiences with ITAEP, and none found that
illuminates the experience of integration through interpretative phenomenological analysis. Additionally, while Baumgartner (2012) examined the nature of technology use among PT faculty, no research to date appears to look at how these faculty members experience teaching with technology. This is an important area to explore, as literature on PT education has described a distinct emphasis on learning across all domains of Bloom’s taxonomy, and research in health professions programs has called attention to unique technology-assisted practices.

Finally, contemporary literature supports the application of the theory of transformative learning to this research. This framework served as the foundation for one study in this review that focused on faculty experiences with online education, and was effective in illuminating the ways that online instruction affected previously held assumptions about teaching. Given this theory’s distinct focus on the influence of values, attitudes, and beliefs on practice, it serves as an appropriate underpinning for the exploration of lived experiences. The investigative approach that was used to apply the theory of transformative learning to this author’s research question will be described in next chapter of this thesis.
Chapter 3- Research Design

The purpose of this qualitative study was to uncover how physical therapy (PT) faculty make sense of their lived experiences integrating innovative technology-assisted educational practices (ITAEP) into their curriculums. The following central, overarching research question was therefore posed: How do physical therapy program faculty make sense of their lived experiences integrating technology-assisted educational practices into the didactic component of their curriculums?

Methodology

The proposed qualitative study followed a constructivist-interpretivist philosophy, and was conducted using interpretative phenomenological analysis. Qualitative inquiry is aimed at exploring or understanding the meaning that individuals or groups ascribe to a social or human problem, and honors an inductive style of research (Creswell, 2014). Interpretivism, which encompasses a number of different paradigms, is concerned with the meanings and experiences of human beings, and espouses the belief that people are constantly involved in interpreting their ever changing world (Williamson, 2006). The constructivist paradigm, which fits within the interpretivist framework, holds the worldview that individual people develop variable and multiple subjective meanings of their experiences, as well as the world in which they live and work (Creswell, 2014). For this reason, constructivist researchers will look for complexity of views as they investigate personally constructed meanings about either broad concepts, or more specific issues or ideas (Creswell, 2014; Williamson, 2006).

Interpretative phenomenological analysis (IPA) is a qualitative research approach that is committed to the examination of how people make sense of their major life experiences, including events, relationships, and processes (Smith, Flowers, & Larkin, 2009; Larkin, Eatough,
Osborn, 2011). This sense making is centered on how people derive meaning from their experiences (Larkin et al., 2011), and is therefore situated within a constructivist framework. IPA has its roots in psychology, and appeared in the mid 1990’s, with work primarily in the area of health psychology. It is an approach with conceptual bases in the areas of phenomenology, hermeneutics, and idiography, which respectively focus on experience, interpretation, and the particular (Smith et al., 2009).

IPA stems from the work of major phenomenological philosophers Husserl, Heidegger, and Merleau-Ponty. While this approach was built on Husserl’s concern for the importance of experience, and the psychological processes of perception, awareness, and consciousness, it evolved to espouse Heidegger’s divergent views that were concerned with the basis of existence, and the ways in which practical activities and relationships are made meaningful (Smith, et al., 2009). Central to this evolution was Heidegger’s emphasis on the concept of *intersubjectivity*, or the “shared, overlapping and relational nature of our engagement in the world” (Smith et al., p.17). Unlike Husserl, who suggested that we must bracket, or put aside our familiar ways of the world in an attempt to concentrate on our perception of that world, Heidegger asserted that it is not possible to abandon our fundamental constitution, and move outwards from an inner world. Heidegger’s viewpoints were echoed by philosopher Merleau-Ponty, who posited that an accurate perception of the world was tied to holistic embodiment within that world (Smith et al., 2009). Ultimately, collective philosophical perspectives led to the emergence of a phenomenological inquiry that focused on the experience of the embodied, situated person, rather than one that focused on the nature of consciousness, or the essence of that experience (Larkin, et al., 2011; Smith et al., 2009).
Heidegger and Marleau-Ponty’s work has been described as hermeneutic phenomenology, as it stresses the idea that understanding is always a matter of interpretation (Larkin et al., 2011). In an attempt to closely understand the participant’s world, IPA recognizes that the researcher’s own conceptions are required to make sense of participant’s experiences, and therefore employs a double hermeneutic (Sampson, 2013; Smith & Osborn, 2008). IPA further builds upon hermeneutic theory through the concept of the hermeneutic circle, which asks the researcher to look at the relationship between the part and the whole, at a series of levels, and approach interpretation in a non-linear fashion. Active engagement in the hermeneutic circle ensures that data analysis is iterative, and that data is thought about in different ways (Smith et al., 2009).

From an idiographic standpoint, IPA is committed to the particular through its emphasis upon detail and depth of analysis, and in its understanding of how phenomena are understood from the perspective of particular people in a particular context (Larkin et al., 2011; Smith et al., 2009). In this way, it is congruent with a focus on the individual, and the unique perspective of that individual. Additionally, it validates the use of the small and purposively selected samples that serve as the foundation for IPA studies (Smith et al., 2009).

A qualitative, IPA approach is well suited to the research question that drove this study. This type of phenomenology serves as an appropriate lens through which to explore faculty experiences, as it is concerned with perception on the individual level (Smith & Osborn, 2008). Through application of a double hermeneutic, with this researcher trying to make sense of participants trying to make sense of their experiences with ITAEP, an IPA approach had the potential to uncover exceptional revelations and elicit deep descriptions about personal experiences. With a focus on educational practice, faculty experiences as they relate to the
participants’ professional worlds were captured. The phenomenologic, hermeneutical, and idiographic foundations of IPA allowed this approach to give rise to themes that identified the distinct perspectives of the PT faculty being studied. Furthermore, these influences helped the researcher to understand the unique experience of integrating ITAEP within a health professions curriculum.

**Site and Participants**

Participants were recruited from the PT department, within a college of health sciences, at an urban university in the northeastern United States. Purposeful, homogeneous sampling, with snowballing methods, was used to recruit 10 participants, including both tenure-track and non tenure-track faculty members within the department. This sampling strategy follows Creswell’s (2014) recommendation that qualitative researchers purposefully select participants, so that they can gain a greater understanding of the problem under investigation (p. 189), and similarly follows the guidelines of Smith et al., (2009), who suggests that it is wise to recruit a homogenous pool of participants for whom the research question will be meaningful (p.49).

The following inclusion criteria were applied to the study:

a. Participants must teach within an entry-level physical therapy program

b. All participants must possess either a master’s degree, clinical doctorate in physical therapy, or other doctoral level degree

c. Participants must have 3-5 years experience teaching, with some responsibility for course design

Following proposal approval by the institutional review board, which can be found in appendix A, a recruitment e-mail was sent to all faculty who meet inclusion criteria for the study (see Appendix B). Included in this e-mail was general information about the study, including the
topic, inclusion criteria, participant expectations, and a statement confirming that participation is voluntary, with a right to withdraw at any time. Willing participants were asked to e-mail the researcher with their intent to participate, and following subsequent contact with these participants to confirm eligibility, explain their role, and answer any questions they may have, a prepared, informed consent form was sent to them, via e-mail, for signature (see Appendix C). A second e-mail was then sent to all confirmed participants, so that an interview schedule could be established, and a pseudonym, that would ensure data confidentiality, could be chosen. Ten participants were recruited for this study, and all ten participated fully. Interviewees were free to select a location that would be most comfortable for them, and at the time of each interview, as recommended by Smith et al., (2009), consent was be re-established verbally, and each participant was informed about the topics that will be covered. At the conclusion of the interview process, and as stated in the informed consent document, interviewees were given a $20 Visa gift card for their willingness to participate in this study.

**Data Collection**

Data was collected in 3 steps, with the majority of data collected through face-to-face, individual, semi-structured interviews. Smith & Osborn (2008) assert that the semi-structured interview is the exemplary method for gathering data in an IPA study. In this type of interview, questions are generally open-ended, and are able to be modified or expanded depending upon participant responses. The goal of the semi-structured approach is the facilitation of comfortable interaction, and a resultant dialogue that enables respondents to provide detailed accounts of the experience under investigation (Smith et al., 2009; Smith & Osborn, 2008; Sampson, 2013). However, as IPA researchers strive to get as close as possible to the experiences of the participant, their presence may also bias participant responses (Creswell, 2014; Smith et al.,
2009). It was important that the researcher remained cognizant of this factor, so that the integrity of the responses could be maintained.

The data collection process began either with the researcher meeting individually with participants, or conversing with them by telephone, e-mail, or face-to-face for approximately 20-25 minutes, in order to obtain background data on each interviewee. At this time, information with respect to number of years in academia, noteworthy skills or credentials, or significant academic experiences, was gathered. This information contributed meaningfully to the database, and allowed the researcher to better understand the unique characteristics of the participants and facilitate in depth analysis.

Step two of the process, the primary interview, ranged from 60-65 minutes in length, and focused on the emergence of rich, meaningful data. The researcher took on the role of facilitator, and engaged in the hermeneutic circle by entering the participant’s world, and allowing the participant to do most of the talking (Smith et al., 2009; Smith & Osborn, 2008). All interviews were audio recorded and transcribed by the researcher. To create a relaxed environment that encouraged the participant to speak freely and comfortably, and provide descriptive and detailed accounts of their experiences, an interview schedule of 10 questions was developed and followed (Smith et al., 2009). The interview protocol that was used for this study can be found in appendix D. At the conclusion of the interviews, each participant was encouraged to record any meaningful reflections that emerged over the days that followed the primary interview. Through critical written reflection, which allows the researcher to better make sense of individual experiences (Larkin et al., 2011; Sargeant, 2009), individuals had the opportunity to further ponder beliefs and perspectives. Approximately 1 to 2 weeks after the primary interview, each
participant was provided with a copy of their transcript via e-mail, and then given an opportunity for review, revision, or clarification of any transcript segments.

Smith et al., (2009) suggests that interview material can be better contextualized with the addition of extra data. This researcher therefore conducted a supplementary review of public departmental documents that including website and curricular materials, as well as essential functions for student competency, so that interpretation of text and formation of themes could be made more authentic. This review occurred throughout the course of data collection. Additionally, in order to capture interview impressions and interactions, note taking was employed during or immediately after each individual interview. Furthermore, in an effort to foster a more insightful data analysis process, the researcher recorded retrospective thoughts about each interview in a reflective journal.

**Data Analysis**

Data analysis took place in accordance with IPA procedures that are both iterative and inductive (Smith et al., 2009). To promote authenticity, a full analysis was conducted on each individual transcript before progressing to the next. The process began by reading and re-reading transcribed text, and creating codes from the text. Codes, defined by Miles, Huberman, & Saldana (2014) as labels that assign symbolic meaning to descriptive or inferential information compiled during a study, set the stage for further analysis (pp.71-72). In IPA research, the practice of coding focuses on semantic context of the transcription. The researcher therefore explored descriptive comments, or those which described participant thoughts and experiences, linguistic comments, or those which were concerned with the participant’s use of language, and conceptual comments, or chunks of text that prompted the researcher to engage in a higher level of interpretation, and reflect upon the participant’s understanding of the matters...
they are discussing (Miles et al., pp. 83-91). This process assisted the researcher in managing large amounts of raw data that allowed further analysis to effectively continue.

After text was semantically coded, hermeneutic analysis progressed by identifying emergent themes from exploratory notes. The creation of emergent themes allows for the volume of detail to be reduced, while the complexity of the text is simultaneously preserved (Smith et al., 2009, p.91). Thematic coding began by identifying preliminary emergent themes that were subsequently consolidated into key emergent themes for each transcript. Themes on both levels were organized and grouped in written form, and recorded chronologically in a written table. Following this analytic step, key emergent themes were grouped and connected in clusters to create what was termed within transcript superordinate themes. Superordinate themes consolidate data to capture the most significant text on the topic being studied. Creation of these themes was performed primarily through processes of abstraction, or establishing patterns between emergent themes, and subsumption, or condensing of emergent themes. (Smith et al., 2009). Superordinate themes were then analyzed across transcripts to create a table of overarching superordinate themes that represented higher order concepts that all cases shared. Transcripts and audiotapes were reviewed throughout the process to ensure that the themes identified as superordinate themes appeared in the majority of transcripts (Sampson, 2013; Smith et al., 2009; Smith & Osborn, 2008).

**Ethical Considerations**

It was crucial that participants in this study were protected, and that data was kept secure. In accordance with ethical guidelines in conducting research, no participant recruitment took place prior to approval by the research site’s Institutional Review Board (IRB). Upon IRB approval and departmental consent, recruitment commenced, and chosen participants were asked
to sign and return the informed consent form that was sent to them via e-mail. Included in this form was contact information for the researcher, and the researcher’s advisor, in the event that subjects had questions or concerns about the study, and wished to contact the investigators. It was stated that the researcher would not use, discuss, or benefit from the data gathered without informed consent from the individuals providing that data. It was also important to include the following: a brief description of study purpose and procedures, confidentiality protection information, a statement with respect to foreseeable risks and benefits, and a phrase offering participants the ability to opt out of the study at any time without penalty (Butin, 2010). No direct risks to any participants were anticipated or experienced. Likewise, while direct benefits to participants would have been unlikely, it was important to be cognizant of the fact that individual reflections had the potential to yield insights that fostered innovation and prompted ideas for course design.

During interviews, it was important that participants were monitored for any feelings of discomfort (Smith et al., 2009). While adverse emotional responses were unexpected when collecting data during this study, any negative reactions that were encountered prompted the researcher to either proceed with a different line of questioning, or refrain from discussing that particular topic during the interview session.

In an additional effort to protect subjects, data was secured in several different ways. During data collection, confidentiality of the participants was preserved through the use of participant chosen pseudonyms. When presenting findings, this researcher avoided the inclusion of any specific information that could lead to identification of any individual participant (Butin, 2010). Electronic files of transcripts were backed up on two different hard drives, and stored in two separate locations. Back up occurred upon the completion of each interview. All materials
written in hard copy form, such as interview or post-interview notes, printed transcripts, or notations made following document review, were stored in a locked safe, with a key that was available only to the researcher.

**Trustworthiness**

IPA recognizes that complete objectivity is impossible, as it is shaped by the researcher’s interpretive worldview, grounded in subjectivity, and dependent upon researcher conceptions (Morrow, 2005; Sampson, 2013). Therefore, three major principles were applied to the inquiry and analysis process of this IPA study, so that quality and trustworthiness were ensured. These principles include the application of Yardley’s criteria, the utilization of member checking procedures, and the inclusion of a written statement of reflexivity.

Yardley’s assessment guidelines, which offer various criteria for assessing the worth of qualitative work, include *sensitivity to context, commitment and rigor, transparency and coherence, and impact and importance* (Smith et al., 2009). These guidelines were honored in all phases of the proposed study. *Sensitivity to context* was ensured through carefully constructed interview questions that promote participant comfort. During interviews, the researcher assumed the role of empathic listener, and worked to elicit detailed responses from interviewees, so that *commitment and rigor* were demonstrated. The research process was clearly and thoroughly documented, ensuring *transparency and coherence*, and the experiences of faculty were analyzed in such a way that the *impact and importance* of these experiences in the worlds of scholarship and practice were well articulated.

Member checking, which allows participants to review final reports, descriptions, or themes for accuracy (Creswell, 2014), was also employed during the course of this study. This took place by asking participants, when contacted for follow up reflection, to simultaneously
verify data and interpretations gathered from their interviews. This data was provided via e-mail, and input returned via e-mail as well.

Additionally, a statement of reflexivity, which asks the investigator to disclose how her perceptions and biases might influence and inform the research process (Newton, 2009), was an important measure of trustworthiness in this study. This statement helped to add a level of credibility to the study, by positioning the researcher as a self-conscious and critical analyst, who was asked to examine emerging self understandings of material, and either set them aside, or incorporate them into analysis (Morrow, 2005).

**Statement of reflexivity.**

There are two areas in which researcher bias had the potential to affect the data analysis process. First, it is the personal experience of this researcher that live demonstration of manual techniques in physical therapy education is superior to the use of technology-based instruction in achieving certain student competencies. Second, this researcher feels that face-to-face educational experiences have significant value, particularly within entry-level programs. These biases, and the ways in which they were managed, can be further understood by looking at researcher positionality.

**Positionality**

My own potential biases and perspectives toward this study have been shaped by years of personal and professional experience. I have been privileged to practice as a physical therapist since 1985, when I received my Bachelor of Science degree in the field. Since that time, I have witnessed ongoing changes within medicine, changes that include the role of the physical therapist as a key practitioner in a health care delivery system that is increasingly complex. This transformation of the profession, though apparent in the world of clinical practice, was more
visible to me when I returned to the academic arena in 2002 to pursue my clinical doctorate in physical therapy. It was at that point that I truly realized how my profession had evolved, how differently today’s generation of PT students needed to be educated, and how much more independently new graduates were expected to function upon entry into professional practice. It was also at that point, as a student in a curriculum that was delivered partially online, that I became familiar with technology practices in education.

In 2008, I became an adjunct instructor of physical therapy, and in this new role, quickly discovered that the instructional methodology with which I was familiar was quite distinct from that being used in my program. Many contemporary strategies were foreign to me, though I was able to assess their value rather quickly. The ways in which faculty were using, or attempting to use technological based approaches, left me asking some complex questions about the role, efficacy, and contribution of technology to our curriculum. In some cases, those questions centered on whether technology was being used simply because it was available, or whether, as Rowe et al. (2013) claim, was being used merely to reinforce didactic, traditional teaching methods. In other instances, I wondered how certain ITAEP, that seemed to have unique pedagogical characteristics not found in traditional methods of learning, could be more fully integrated into our courses. On still other occasions, I found myself stepping back and contemplating how technology should be used most judiciously in preparing future health care practitioners for a career that was largely hands-on.

Samaroo, Dahya, and Alidina (2013) assert that it is important for researchers to situate themselves in their research by become aware of and revealing their own positionality. After a great deal of personal reflection on the subject of technology in education, I find that making sense of my own experiences has been no easy task. I have, however, developed some firm
perspectives and therefore, assumed some biases. I believe that some traditional methods of teaching in PT programs have great value, and contribute well to psychomotor learning. I believe that an infusion of technology into any one course must be done with great care if the promotion of self-efficacy in learning is a goal. I simultaneously believe that technology has a great capacity to address the needs of the diverse population of students now enrolled in higher education, and that under certain circumstances, ITAEP have great potential to engender higher order thinking and promote executive functioning.

Having acknowledged these biases, I was committed to the analysis and meaning making of my participants’ experiences with an open mind. Through interpretative phenomenological analysis, which, in part, asks the researcher to take the side of the participants (Smith & Osborn, 2008), I endeavored to better understand alternate points of view. I additionally sought to broaden my horizons on my chosen topic of research, and further worked to minimize any bias.

Limitations

While this study has the capacity to make a valuable contribution to the literature, it is not without limitations. Though small sample sizes, and purposeful, homogeneous sampling are recommended for IPA studies, these parameters may limit findings. It is possible that a larger sample size could uncover a theme or generate data that may not have been revealed in this study. Additionally, a select number of participants, whose responses are subject to in depth analysis, may not be representative of larger groups of faculty. Achieving a representative sample, however, is not the goal of most forms of qualitative research (Sampson, 2013), and a ten person participant pool corresponds to the recommendations of Smith et al., (2009) for conducting an IPA study.
The term generalizability is used in a limited way in qualitative research, as this form of inquiry strives to understand the perspective of particular people in a particular context. (Creswell, 2014). It is important, however, that research findings are important and useful (Smith et al., 2009). While findings of this study are useful to the researcher, the participants, and the institutions with which they are affiliated, the applicability of findings to outside organizations may be limited by the research question and type of analysis performed. Additionally, with interviews limited to physical therapy faculty only, findings may be less significant for faculty in other higher education programs and departments. Finally, findings might be viewed cautiously by faculty members who teach at smaller institutions, with fewer resources.

**Summary**

The material presented in chapters 1-3 has laid the foundation for this researcher’s study. In chapter one, the justification for and significance of this study was established, and an overarching research question was presented. Additionally, a theoretical lens that guided data collection and analysis was introduced. In chapter 2, relevant literature, that helped shape qualitative data collection in a rich and meaningful way, was reviewed. In chapter 3, details regarding study protocol and procedure were provided, including a rationale for the chosen methodology, and any study limitations that existed. In chapter 4, research findings will be presented.
Chapter 4- Findings and Analysis

The purpose of this study was to uncover how physical therapy (PT) faculty make sense of their lived experiences integrating innovative technology assisted educational practices (ITAEP) into their curriculums. This study was conducted through an interpretative phenomenological analysis that was designed to extract deeper meaning from, and make sense of, those personal experiences. Data collection was guided by the following research question: How do physical therapy program faculty make sense of their lived experiences integrating technology-assisted educational practices into the didactic component of their curriculums?

Ten faculty members participated in this study. Participants had between six and twenty four years of teaching experience in entry-level physical therapy programs. Five of the ten interviewees had teaching experience in more than one institution. (Table 1).

Table 1.

Participant Information

<table>
<thead>
<tr>
<th>Participant</th>
<th>Number of years teaching in a physical therapy program</th>
<th>Number of institutions in which participants have taught</th>
<th>Participant Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katie</td>
<td>24 years</td>
<td>2</td>
<td>Female</td>
</tr>
<tr>
<td>Elise</td>
<td>22 years</td>
<td>1</td>
<td>Female</td>
</tr>
<tr>
<td>Ida</td>
<td>20 years</td>
<td>2</td>
<td>Female</td>
</tr>
<tr>
<td>Elmer</td>
<td>8 years</td>
<td>1</td>
<td>Male</td>
</tr>
<tr>
<td>Joseph</td>
<td>6 years</td>
<td>1</td>
<td>Male</td>
</tr>
<tr>
<td>Maude</td>
<td>17 years</td>
<td>1</td>
<td>Female</td>
</tr>
<tr>
<td>Jackie</td>
<td>14 years</td>
<td>2</td>
<td>Female</td>
</tr>
<tr>
<td>Dorothy</td>
<td>14 years</td>
<td>2</td>
<td>Female</td>
</tr>
<tr>
<td>Elizabeth</td>
<td>15 years</td>
<td>1</td>
<td>Female</td>
</tr>
<tr>
<td>Jesse</td>
<td>22 years</td>
<td>2</td>
<td>Female</td>
</tr>
</tbody>
</table>
An analysis of transcripts yielded three superordinate themes and eight nested subthemes that captured the ways in which participants made sense of their experiences integrating ITAEP into physical therapy education. These themes were formed through careful interpretation of the data that emerged in each individual transcript. The first two superordinate themes surfaced from interview data that recurred in all ten transcripts, while the third emerged from the experiences of nine participants. In this chapter, superordinate and nested sub themes that emerged during cross analysis will be discussed and described. Verbatim quotations, and descriptions of participants’ perceptions and reflective thoughts will be included as supportive evidence.

Pseudonyms have been used for all participants. Each themed section will conclude with a summative analysis. Combined superordinate themes and their nested themes were: 1) Awareness of Barriers (1.1 unwelcome feelings, 1.2 influence of external factors, 1.3 sense of dependence); 2) Appreciation for educational contributions (2.1 encouraged by versatility 2.2 inspired by cognitive development 2.3 encouraged by student input); and 3) Respect for Program Integrity (3.1 encouraged by in-person practices in physical therapy education, 3.2 intentional about change). Themes are additionally displayed and characterized in Table 2.
### Superordinate and Nested Themes

<table>
<thead>
<tr>
<th>Superordinate Themes</th>
<th>Nested Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Awareness of Barriers</strong></td>
<td>1.1 Unwelcome feelings</td>
</tr>
<tr>
<td></td>
<td>• <em>Feelings of fear, insecurity, anxiety, regret, perceived lack of intuition</em></td>
</tr>
<tr>
<td></td>
<td>1.2 Influences of external factors</td>
</tr>
<tr>
<td></td>
<td>• <em>Influence of barriers created by the impact of issues regarding time, infrastructure, usability, differing points of view</em></td>
</tr>
<tr>
<td></td>
<td>1.3 Sense of dependence</td>
</tr>
<tr>
<td></td>
<td>• <em>Reliance on colleagues, technical support staff, or outside individuals to successfully implement practices.</em></td>
</tr>
<tr>
<td><strong>2. Appreciation for Educational Contributions</strong></td>
<td>2.1 Encouraged by versatility</td>
</tr>
<tr>
<td></td>
<td>• <em>Pleased with the multimodal approaches to learning via technology, so that different types of learning preferences and needs can be met</em></td>
</tr>
<tr>
<td></td>
<td>2.2 Inspired by cognitive development</td>
</tr>
<tr>
<td></td>
<td>• <em>Enthusiasm for the manner in which ITAEP, including discussion board forums, interactive software, or enhanced imaging, facilitates and support higher order cognitive thinking and learning</em></td>
</tr>
<tr>
<td></td>
<td>2.3 Encouraged by student input</td>
</tr>
<tr>
<td></td>
<td>• <em>Feeling receptive to and accepting of the way in which student feedback and reflection contributed to sound educational practice.</em></td>
</tr>
<tr>
<td><strong>3. Respect for Program Integrity</strong></td>
<td>3.1 Encouraged by in-person practices in Physical Therapy education</td>
</tr>
<tr>
<td></td>
<td>• <em>Experiencing a sense of respect and appreciation for the educational benefits of face to-face practices in a healthcare curriculum that demands sophisticated skill acquisition in the psychomotor and affective domains of learning.</em></td>
</tr>
<tr>
<td></td>
<td>3.2 Intentional about change</td>
</tr>
<tr>
<td></td>
<td>• <em>Feeling that a prudent and contemplative approach toward technology integration is paramount to ensuring that ITAEP is included in the curriculum in a balanced, meaningful, and appropriate way.</em></td>
</tr>
</tbody>
</table>
Awareness of Barriers

This first superordinate theme that emerged through data analysis relates to faculty experiences with the internal and external barriers that often curtailed or sometimes thwarted their efforts to enact meaningful change. In response to questions about how technology integration made them feel, or what the integration process had or has been like for them, faculty revealed the undesirable personal feelings that affected their ability to transform teaching practice through technology. They additionally felt influenced by external factors that negatively impacted their attempts to integrate technology assisted educational practices into their teaching. External barriers included not only the time and labor required to implement innovations, but also the hardware and software complications that often accompanied technology based initiatives. Furthermore, participants experienced a sense of dependence upon other individuals and entities, fueled by internal and external barriers, and magnified by training initiatives that were perceived as inappropriate. Three nested themes were therefore identified within this superordinate theme. These were, undesirable feelings, the influence of external factors, and a sense of dependence.

Unwelcome feelings.

To varying degrees, unwelcome feelings rendered the transition to the use of educational technology challenging for most interviewees. While some participants experienced fear, others expressed feelings of inadequacy or insecurity, and still others felt discouraged by a perceived lack of intuition. Katie described how her feelings manifested early in her transition:

The first time I used power point, I cried….it’s been challenging, because I am a technology moron. So, I actually went to a seminar on how to use blackboard, and I cried,
I was so frustrated. Every time I try a new thing, I get really worried, I get really anxious, because things do not always go well (personal communication, July 20, 2015).

Katie appeared keenly aware of the extent to which her own insecurities affected and continue to affect her teaching practices. She also expressed some concern about how her challenges were perceived by others, and admitted to feeling that her students were continually comparing her to faculty members who were skilled and comfortable using various technological modalities. Her honesty appeared to serve her well. Rather than hiding behind her feelings, Katie revealed the ways in which her sense of inadequacy worked to her advantage. She spoke about how she became assertive in requesting assistance and support. With references to new strategies she was thinking about trying, she also described how she was committed to conquering her negative self-perceptions.

Ida seemed equally as aware of the ways in which her own emotions hindered her use of ITAEP, though her sentiments appeared less rooted in anxiety, and more grounded in distress. When asked about how the transition to the use of technology in teaching made her feel, Ida remarked:

Old, just old. Old, but more specifically, inept, a novice, generation gap kind of thing…regretful, disappointed, more in myself, that I’m not embracing it more…it makes me feel like my approach to teaching is still steps behind perhaps what it could be…that it could be richer (personal communication, July 28, 2015).

Continuing on, she metaphorically stated: “I’m not getting myself out of my way” (personal communication, July 28, 2015), which indicated to the researcher that her feelings impacted her ability to engage in critical reflection about best practice, and that her own teaching methodology might be compromised.
Several participants highlighted the notion that lack of intuition with technology-based practices resulted in frustration, discomfort, and feelings of inadequacy. When asked about any hesitation she might have toward integrating technology into her teaching, Elizabeth admitted that, “it’s probably that I don’t feel comfortable with it; I would say it’s not a real strength of mine” (personal communication, September 10, 2015). Elise similarly remarked: “I’m just not a technologically savvy person…. I think if I were more technologically savvy it could do a lot more for me, but I’m not” (personal communication, July 21, 2015). These sentiments were echoed by Jesse and Dorothy, who respectively stated: “technology for me is scary, because it’s just not intuitive for me at all” (Jesse, personal communication, September 24, 2015) and “it’s always a struggle, I feel like it’s not intuitive to me to use technology” (Dorothy, personal communication, September 10, 2015).

Despite the similar descriptors used to express personal barriers, it was apparent, through the inflection of each voice and demeanor of each individual, that each participant had a different level of acceptance about how their personal emotions impacted their professional growth. Elizabeth appeared to have some difficulty reconciling the idea that intrinsic barriers were preventing her from moving forward with technology use. Conversely, Elise seemed to view her internal insecurities as impediments, but like Ida, felt somewhat powerless to change them. Both Dorothy and Jesse were comfortable discussing their self-doubt with respect to technology use, and both voices resonated with strength and determination, suggesting that these participants were determined to rise above their feelings of inadequacy, and find ways to become more proficient with ITAEP.

Joseph, though more tentative about his insecurities, nevertheless acknowledged them and perceived them as a barrier. He recognized that his limited use of innovative technologies
was partially due to feelings of incompetence. He admitted that he does not “use it a lot,” and feels that he “unfortunately doesn’t do anything dynamic.” He stated: “unfortunately, my level tops off at blackboard….I have to get better at using technology” (personal communication, August 4, 2015). However, as dialogue emerged, and Joseph spoke a bit more about some of his experiences, specifically with the use of online discussion boards, he was able to see how his implementation of ITAEP was a bit more sophisticated than initially perceived. This realization indicated to the researcher that Joseph could benefit from a greater level of reflection about the types of technologies that impact pedagogy, and his ability to make a difference in student learning by engaging with various educational modalities.

**Influence of external factors.**

Faculty were candid and unreserved when discussing their experiences with the external barriers that affected the integration of technology into their educational endeavors. Participants felt that these hurdles strongly and negatively influenced their efforts to weave technology into their teaching modules. The researcher sensed that external barriers additionally contributed to lack of understanding about how to best use certain practices, though this was not directly expressed during interviews. Ida viewed lack of time as a significant deterrent toward taking the first step needed to familiarize herself with various technological modalities. She stated: “I really don’t feel I have the time to really get down and dirty with the various technologies to see what’s available to me. I’m not taking the time to see what would be helpful” (personal communication, July 28, 2015). Upon further questioning, it became clear that certain internal barriers, including a decreased understanding of how to use certain technologies, may have complicated Ida’s perspective on external barriers. This was exemplified in a statement about
how she needed to “explore” the different tools that were available to her (Ida, personal communication, July 28, 2015).

Jackie, who had substantial experience with technology in education, had a different perspective. In reflecting upon her efforts to include technology in her teaching modules, she shared her thoughts about why she hesitates to incorporate ITEAP, and offered the following response:

It takes a lot of time, and it takes a lot of time to understand it, and learn it yourself to do it right. We don’t get extra time. So, you need to take time off from something else. So, when they integrate into a research project, or when you integrate it into a grant, then all of a sudden you’re getting credit for that time. There are techniques, like I could use the clicker system, but the amount of time and effort to prep for that class…when I had something else planned, isn’t going to happen….so the hesitation is finding the time, and somebody valuing your time (personal communication, September 8, 2015).

Jackie further recalled a transition to online instruction, and commented on how she spent “hours sitting there reading manuals, so I could figure out what worked.” She additionally felt that this experience was not the “best use of her time.”

A significant portion of Jackie’s dialogue suggests that time constraints could be better addressed if pedagogy was deemed equally as important as other academic initiatives in the higher education arena. It was an inference that was reinforced by Dorothy in her transcript:

The clickers; I probably spent one hundred hours; I’m not exaggerating, trying to use them in my class. I could never get them to work for various reasons…even working with the tech. people. So, that was incredibly frustrating to me to still spend that much time, and not be able to use them in class (personal communication, September 10, 2015).
Dorothy went on to talk about how demands upon instructor time were often a result of flawed or underdeveloped infrastructure. She recalled that attempts to integrate technology-based software led to the discovery that it only “worked with Firefox some days; Chrome some days,” and that she “could not really use it consistently” (personal communication, September 10, 2015). She further explained that the inability of support specialists to explain inconsistencies in the system led to the potential for apathy among faculty who were trying to take their teaching practices to a different level. For Dorothy, the impact of external factors upon technology integration was profound.

Elise similarly discussed challenges with infrastructure. She spoke about how equipment related issues provoked hesitation with respect to technology integration. “Just being able to use the equipment and knowing how to run it smoothly, when you’ve got maybe five minutes in between a class, or backing up into a class,” was described as a source of stress for her. As she spoke about the use of audio-based technology, she was reminded of instances that she found “intimidating.” She recalled having difficulty “figuring out what to do, and what to push, and making sure it’s continuing to run the whole time.” This barrier was significant to the extent that Elise felt as though she was not “apt to use” certain ITAEP, and to a degree that seemed to limit her curiosity about innovative technology (personal communication, July 21, 2015). Maude, conversely, felt less defeated by a process that she vocalized as “difficult,” and “a lot of time and effort.” She reflected upon her use of videos during instructional sessions, and talked about feelings of “frustration when they didn’t work properly.” Her dialogue, which made frequent references to technology integration as “difficult,” and “a lot of work,” and characterized it as a major instructional hurdle, was tempered by the feeling that it was “overall worthwhile”
(personal communication, August 5, 2015). In that sense, she was clearly committed to personal growth and transformative learning.

Elmer identified external barriers somewhat differently when he spoke about his experiences team teaching. He described technology integration as “difficult” when you are sharing responsibility with other instructors, because the implementation of innovative practice requires that “more people buy into it.” He gave the following example: “I want to incorporate some kind of clicker, but where I only lecture five or six times a semester, the primary lecturer wasn’t prepared for that, or didn’t want to initiate that” (personal communication, July 28, 2015).

Throughout his interview, Elmer continued to talk about his desire to see personal response systems integrated into in certain physical therapy courses. His insights illustrated the ways in which contrasting beliefs about best practice can be a significant barrier in contemporary healthcare curriculums, where more faculty may be involved in the design and execution of classroom experiences. Conflicting viewpoints additionally ask professors to move beyond the examination and transformation of their own perspectives on pedagogy, and work toward shaping the habits of mind and points of view of others.

**Sense of dependence.**

Across transcripts, participants described the sense of dependence they experienced as they felt the need to rely upon colleagues, technical support staff, or other outside sources to assist them in the process of technology integration. While some interviewees expressed their appreciation for on-campus academic technology services, a majority felt that training initiatives, designed to be broad and encompass a diverse professional population, did not adequately meet their needs as instructors in a healthcare curriculum. Interviewees additionally believed that current support systems were unable to prepare them for independence with technology use, and
perpetuated a reliance on external sources. It was the perception of this researcher that most faculty felt uncomfortable requiring frequent directives, and that feelings of dependence hindered efforts to use ITAEP. It was also this researcher’s sense that participants desired greater autonomy with course design, evidenced by statements that called for more tailored and personalized support systems that would help to promote self-sufficiency. Elizabeth offered some insights into why she lacked independence in technology integration. With respect to training opportunities, she commented on how current initiatives are well intentioned but inefficient by saying: “they have some, but it’s kind of restricted. You can get access to it, but maybe not as much as you need… if you have only one person available, he can only do so much” (personal communication, September 10, 2015). She additionally alluded to a technology based initiative she was currently working on, describing it as a “challenging,” project that requires “help from someone in the college…who can work through the pieces.” Maude expressed similar experiences as she described her evolution from overhead projectors to video based learning, to the use of PRS’s by stating: “it’s taken a lot of work and technical support to integrate technology into teaching” (personal communication, August 5, 2015). Both participants indicated that their efforts would have been derailed without appropriate guidance. Likewise, both felt that autonomy could be fostered by changes “on the departmental level” (Elizabeth, personal communication, September 10, 2015), or through a “department that facilitated more training in something like clickers”(Maude, personal communication, August 5, 2015).

Katie openly discussed her need for individualized technology based support, and her experiences receiving that support. She stated:

I feel I am being compared to people who are doing it better…but (this institution) have people available to help you, so I counted on them. One individual was fantastic,
another came to my office every week for eight weeks, and then he cut me loose, and I said, oh my God, you can’t cut me loose, but he did” (personal communication, July 20, 2015).

Despite a high level of reliance on outside professionals, Katie did not recommend or express a desire for training approaches that might promote independence in technology use. Unlike other participants, she appeared to be at ease with the level of support she required.

Joseph’s reliance on others for technology integration resulted in revamping of educational plans, and in some cases, abandonment of further efforts to implement new innovations. He recounted the following example of an audio-recorded lesson:

After learning that some of my initial attempts at trying to do it were not successful, I had someone record some slides, and there is a quiz on the slides, and I can say in good faith that they’ve seen the material, understand the material….I think some of the resource sharing made some of the barriers go away (personal communication, August 4, 2015).

Joseph additionally spoke about how dialogue with peers is necessary for successful implementation of ITAEP. He talked about the need to have conversation centered on the idea that “you figured out to use this…so what’s the easiest way for everybody to get clickers and have that on our platforms.” It was his experience that input from colleagues regarding technology related issues was essential for success. It was also his perspective that feelings of dependence could be minimized if interactions were more collaborative, with an effort to create a uniform approach to training that allowed faculty to “all get oriented to something,” and feel secure about its use.

Conversely, Joseph spoke about how one attempt to be independent with technology implementation led him to a place where he “gave it one try, and didn’t go back to it.” Rather
than seek assistance, he allowed his sense of dependence to hinder any additional efforts. Upon further reflection, he stated: “that’s the hard part, you try something new, and it doesn’t work, and it’s hard to go back to it” (personal communication, August 4, 2015).

Dorothy articulated her beliefs about how current support initiatives might inadvertently foster a culture of dependency. She described ways in which approaches taken by technical support staff were not able to tap into her specific needs, and left her needing more assistance. “There have been barriers,” she said, “people kind of repeat what I already know…they couldn’t help me get to the next point.” Implying that staff were preventing her from gaining independence, she added: “We don’t want our students to look for hand holding, and it’s not what I would expect for faculty either.” She continued with the following example:

They’re not actually helpful…we had a faculty meeting this week….they were giving all these examples of things…and everyone was sitting there going, what? That’s it, then they walk away… if you heard something that might be useful… then you have to seek it out” (Dorothy, personal communication, September 10, 2015).

Jackie spoke about the need for considerable support from both colleagues and technology specialists in the process of organizing an online course. She recalled the difficulty she experienced when trying to obtain support from outside sources, and the barriers that she encountered in her quest to incorporate ITAEP into her teaching:

There were courses that would teach you how to teach online, but they wouldn’t let me enroll in that, because I wasn’t part of that department… so, I found that making a big leap to an online situation without that was learning under fire. Some of it I figured out intuitively, other things, I didn’t. Now, there are people who were great at answering my questions, if I asked the questions, after I got stuck. I did get there, but it was a lot of
work, a LOT of work…and sometimes I would have to say, let’s not do that, let’s change it up” (personal communication, September 8, 2015).

Jackie went on to talk about how, in addition to training sessions, she depended upon colleagues to help her carry out certain technology related teaching initiatives. She relayed a story about a project that she completed with a colleague, which she “never would have done on her own,” and discussed how “the 3D printer, that technology, the computer animated stuff was so over my head that he had to lead me through that” (personal communication, September 8, 2015).

The researcher sensed that the interview process was somewhat cathartic for Jackie, as she openly conveyed the turmoil she experienced, and the self-discipline she needed when integrating ITAEP into her courses. Despite the difficulties she had faced, Jackie emphasized the need to continue learning and mastering innovative teaching techniques. Her belief that employing educational technology is “valuable” and “positive” was strong enough to help her overcome obstacles (personal communication, September 8, 2015).

Jesse added some interesting insights to the nested theme of dependence upon others. She described her own “steep learning curve” with respect to technology use and felt that greater independence could be fostered by having additional “access to resources” (personal communication, September 24, 2015). While Jesse did not directly express reliance upon outside individuals, she recognized the support that her colleagues required, envisioned a need for greater independence with implementation of ITAEP, and suggested interventions that she thought would be valuable. She stated that she would “make sure there were resources, integrate it into the department…bring it to the people.” It was her experience that dependence could be
decreased by “bringing it to the people, so they see the value of it, and use it” (personal communication, September 24, 2015).

Jesse also underscored the idea that revamping training protocols could help to reduce some of the internal barriers that preclude some faculty from transforming their teaching practices. It was her perception that the need for teamwork in the educational arena was of paramount importance. It was also apparent that Jesse highly valued a collaborative environment.

Identifying experiences with barriers that made the integration of ITAEP difficult and tumultuous simultaneously led participants down a path of self-discovery. When discussing internal obstacles, there was a perception that several participants had not previously come to terms with the degree to which their feelings affected their ability to enact change. The researcher did not interpret this as an act of denial, but rather, as a limited awareness about the relationship between personal feelings and professional growth. With respect to external factors, while interviewees were forthcoming about the influences of time and faulty infrastructure, only one faculty member experienced the sense that her time spent on technology integration was undervalued. This experience was interesting and significant, and may have implications for professional development initiatives. Additionally, the researcher sensed that frustration and weakness accompanied the sense of dependence that participants experienced. For most faculty members, reducing reliance upon others seemed crucial to future success with technology integration. Furthermore, initiatives to bolster independence would likely convey to faculty that their ongoing effort and dedication to the education of future healthcare professionals is valued. Such recognition could serve as a motivating factor, and be enormously influential in facilitating pedagogical reform.
Appreciation for Educational Contributions

The second superordinate theme in this study relates to participant experiences with various types of educational contributions, including those that emerged inherently through technology use, or those that were externally generated, and helped evaluate the impact of technology-assisted practice. Participants appreciated contributions that they believed enriched the learning process, or alternatively, helped them to better understand it. They were encouraged by the ways that ITAEP offered them a flexible approach to teaching, enabled them to reach different types of students in novel ways, and afforded them the ability to more effectively convey complex theoretical and clinical concepts. Faculty recognized that ITEAP had positive effects upon higher order thinking and cognitive domain learning, and became inspired by its potential to enhance the educational experience. On a different level, faculty valued student input that enabled them to better integrate certain practices, and understand how technology could be leveraged to improve teaching and learning. This led to three nested themes: encouraged by versatility, inspired by cognitive development, and encouraged by student feedback.

**Encouraged by versatility.**

Through the process of technology integration, participants recognized and valued the ways in which technology integration enabled them to reach and teach different types of learners. They expressed that the student population is comprised of individuals with different strengths, who learn more comprehensively by utilizing a variety of modalities. They additionally remarked that while some students have strong visual learning skills, others do well with audio reinforcement, and still others may have learning differences that require alternative approaches. Participants perceived ITAEP as able to offer a multimodal approach to learning that appealed to diverse individuals, and helped students grasp and internalize new material.
When discussing the use of sophisticated imaging equipment in the classroom, Jackie shared her perspectives on how innovative technologies have helped her reduce student frustration with respect to integration of new academic concepts. She remarked: “I think technology is speeding up the learning process; I think it’s giving them some different ways to visualize the same thing, because everyone learns differently” (personal communication, September 8, 2015). Maude concurred, and further articulated the benefits of visual aides when describing the positive effects that video clips have on the acquisition of clinical knowledge:

I think that students have different learning styles, and what works for one student might not work for another. If I’m describing a patient with a pathology, it’s nice to have a video of that. If I’m describing a special test, it’s nice for me to be able to show a video of someone who has a positive test, or finding, and students can just see it right there and then. So, instead of trying to describe it, using a video can help with that (personal communication, August 5, 2015).

While Maude’s statement clearly points out the advantage of video based learning, it also indicates that she views the use of video as beneficial to the instructional process, and as a means of bringing clarity to what could otherwise be a confusing lesson. Both Maude and Jackie perceived the inclusion of visually based technology as positive for both the learner and the instructor. Jackie indicated that with integration of ITAEP, she has “learned a lot along the way” (personal communication, September 8, 2015), and Maude stated that it has been “interesting and fun to be part of the process” (personal communication, August 5, 2015).

Commenting on the benefits of audio-based learning, two faculty members shared their perspectives on how Tegrity has allowed students with different information processing styles to expand their learning strategies, and more fully integrate verbal information. Elmer recounted his
experiences as a lecturer, and said: “I find that some people learn differently, some people would rather come to lecture and not take notes…. some people would rather sit there and take notes and then revisit it and listen to it while they’re updating their notes.” He further added that as higher education is increasingly adapting to many different types of student learners, the “people that need repetitive things can get it” (personal communication, July 28, 2015). As he went on to explain how his own pedagogical and learning style involves frequent repetition of material, it was clear that he perceived Tegrity as a positive contribution to the student experience. His sentiments were echoed by Jesse, who stated that Tegrity enables students to “go back, and if they’re a Saturday morning cup of coffee at six o’clock in the morning person, they can customize how they get information and when they get it” (personal communication, September 24, 2015).

While most physical therapy students have great insights to share, some are anxious or uncomfortable about participating in live class discussions. Ida reflected on how online discussion forums have addressed the needs of those who are reluctant to speak, by pointing out that online learning allows students to “reflect at their leisure within prescribed parameters, and the outcome of that is that you get to hear from everybody as opposed to just the most vocal few” (personal communication, July 28, 2015). Katie agreed, stating, “Discussion board could be a way to engage students,” and elicit “personal responses to things” (personal communication, July 20, 2015). Katie continued to comment on how ITAEP addresses the needs of different learners with a significant statement about how education has changed for students with learning disabilities.

When I get my LD students, and they need a note taker and stuff, I think you need less of that because you can just go back and listen. I have two students now who need untimed
tests in a quiet place, and I e-mailed both of them and I said, do the online tests work for you. They said online tests work for me. That takes a whole element of the student having to be absent from class…a lot of students are embarrassed to be absent from the class when they take a test…they think it gets noticed by their classmates. You don’t have to do that with an online test (personal communication, July 20, 2015).

Katie’s account reflects her belief that technology integration not only provides the necessary accommodations that some students need, but may help elevate their potential as well. Across interviews, statements suggested that participants valued the individualized approach to learning that is made possible by ITAEP. They additionally experienced the sense that the ability of technology to enhance instructor delivery of material increased its pedagogical worth, and added depth to learning. It is possible that they also see the ways in which ITAEP can be of value to them personally as they continue on a journey of lifelong learning.

**Inspired by cognitive development.**

Participants conveyed the idea that in the process of integrating of ITEAP into their teaching, they had experienced an evolution in their understanding of and appreciation for the ways in which technology can facilitate higher order learning. This appeared to this researcher to be a revelation that fostered feelings of enthusiasm and gratification among interviewees, and energized them to continue developing their own teaching practices. A majority of participants expressed clear and impassioned views about how innovative and interactive technologies facilitate in-depth learning and metacognition. Several described the positive impact of online discussion or scholarly forums. Katie enthusiastically discussed her creative use of the discussion forum, and shared her perspective about how this learning platform deepens knowledge creation when students are assigned specific tasks. “There is this thing called embedded experts,” she
explained. “You can create embedded experts in your class, and require them to teach other people, which works really, really well with technology.” To this, she added: “now I understand that there is tremendous power in having an online discussion” (personal communication, July 20, 2015).

Joseph recounted his transition from a live to an online model of teaching. He spoke about the richness of student responses in an online ethics module, and commented on the efficacy of the technology based course design. When comparing this module to the traditional, in class exercises that were created for the same academic material, he felt “more satisfied that they are really understanding the concepts they need to understand … a lot more satisfied” (personal communication, August 4, 2015). In describing this transition, and his perception that the in class activity had resulted in such a poor learning outcome, it was apparent that the technological interface helped Joseph to feel more secure and confident in his role as an instructor. The researcher sensed that the online environment allowed him to take a deep breath and reorganize his thoughts. Similarly, Ida felt that online forums enabled her to add greater dimension to her lessons, while simultaneously garnering “more robust responses, more thoughtful responses” (personal communication, July 28, 2015). Additionally, she found her professorial role to be more enjoyable and fulfilling.

Jackie’s interview responses reflected her strong commitment to technology based teaching, and her sincere desire to see her students succeed academically. She spoke freely and honestly about the trial and error that is necessary in order to design an online learning opportunity that is meaningful and comprehensive. In describing her role as a facilitator of learning, Jackie had this to say about the cognitive benefit of online education:
I can get them to that cognitive level, or that processing level faster….I think that when they go through the technology, and you’re guiding them through that, they feel like they like they’re teaching themselves. I try to tell them that’s active learning, and active learning is actually going to stick with you better… It’s more work for them…I think that when they do it, they actually learn to get the information better (personal communication, September 8, 2015).

Adding to perceptions about higher order learning, both Maude and Dorothy alluded to some of the specific practices that they discovered to be intellectually stimulating. Maude talked about how technology has “definitely contributed significantly in the cognitive domain of learning,” because “there are a lot of different blogs out there that they can use…they can get on Google drive, they can make changes and discuss things online” (personal communication, August 5, 2015). She spoke enthusiastically about an experience with an I-pad application that she felt enhanced a particular learning module. She explained:

“We were doing that project where the students had to pick and activity and analyze the movement patterns…we showed them that app…they could pick an axis of rotation and joints, and draw some lines, and look at reaction forces, and compare view, and use slow motion…they found it helpful.”

The researcher interpreted that Maude was inspired by the multiple ways that this innovation required students to multi-process information.

Exhibiting a comparable level of enthusiasm, Dorothy engaged in rich dialogue about how her colleague introduced her to software that designs digital patient case studies, and asks students to problem solve complex medical scenarios. She provided an articulate account of how this ITAEP advances learning:
The way they are structured, I do believe they help people with thinking about their thinking, the metacognition; analyzing how they’re thinking about a situation. They are able to start with one question about a case, and depending upon their answer, they might get a different set of questions. So, they can learn from that. I think it’s difficult to do that type of critical reasoning, decision making, teaching in a lecture….I think it’s good to give them the more foundational information and knowledge and have them participate in these case studies where they have to synthesize and apply material; higher level Bloom’s taxonomy, and then also, in real time, get the great responses (personal communication, September 10, 2015).

Dorothy, who viewed problem-based learning as an exemplary approach in education, also viewed the integration of digital case studies as aligning with her philosophical beliefs about teaching and learning. This, in addition to her perception that this technology-assisted practice yielded greater cognitive benefits than traditional methods, motivated her to continue investigating ways that ITAEP could be embedded into her teaching. She commented: “finding the technology that will assist and facilitate learning is the best part of my job.” Likewise, with an increased understanding of how technology facilitates learning, a number of interviewees seemed to experience enhanced motivation to further pursue innovative technology integration, fueled by the realization that it can elicit higher order thinking and learning.

**Encouraged by student input.**

Participants were encouraged by the ways in which student input contributed to the educational experience. They conveyed the importance of a student-centered approach to teaching and learning. Guided by the belief that millennial learners are technologically savvy, faculty felt that student feedback and reflection could help them effectively implement
innovative practice and work toward educational success. Additionally, the majority of faculty felt that student contributions fostered increased awareness about innovations that were most helpful, cultivated a collaborative pedagogical climate, and helped to shape course design.

Elizabeth spoke about her appreciation for student feedback in the following way:

I certainly try to do the follow up piece and evaluate it with students, what works, what doesn’t work, and close that loop. It isn’t that you just keep putting things out there, you try to say, OK, I’ll make this change and then get feedback to see if in fact that did make a change or improve anything (personal communication, September 10, 2015).

Elizabeth also discussed a specific instance in which she chose to pursue a video based learning technique, and through student input, learned more about the pedagogical advantages of using video. “I got great feedback from the students,” she recalled, and “really saw improvement in their test taking after integrating those.” Throughout Elizabeth’s interview, it was clear that she both welcomed and relied consistently on student feedback to guide her teaching practices. Additionally, she took a systematic approach to integration of ITEAP based on how different technologies resonated with her students.

Jackie shared a similar story about incorporating video to teach manual therapy techniques. Though initially uncertain about the efficacy of this approach, she talked about how “we did do a little bit of (student) research on it when we first integrated it to find out how students liked it, and it’s been great, and we’ve kept it in the class since then.” She went on to emphasize the importance of garnering student input and learning from students when she said: “you need to assess it to make sure it’s working; you definitely have to collect the data… you don’t just assume it…if you don’t use it right, it’s worse” (personal communication, September 8, 2015).
Jesse spoke more passionately about student feedback and reflection. She stated: “I need to meet students where they are… since they are my clients, I really need to be working with what’s going to work for them.” She expanded on this by discussing the need to “check in with her client” for feedback on her practices, and “ask lots of questions about technology and what suits them better, and what they like” (personal communication, September 24, 2015). Analytic memoing captured a demeanor that was spirited and upbeat, and her responses were interpreted on several levels. First, they highlighted the perspective that a provider-consumer relationship is essential to best teaching practice. Second, they suggested that students be active participants in course construction. While this viewpoint is inconsistent with a traditional teaching model, it aligns with the more contemporary notion that student feedback is important, and supports the idea that student perspectives can positively influence pedagogy. Third, they conveyed an equal partnership in learning between students and instructors, and implied that students empower their instructors to continually improve upon their practices and engage in professional growth. The latter interpretation was reinforced when Jesse stated: “I’m asking them to expand and grow; I think I need to do the same thing” (personal communication, September 24, 2015).

Dorothy’s thoughts about student reflections were somewhat similar to Jesse’s, and prompted some of the same analysis. When discussing her use of online digital case studies, she remarked: “The students have given me overwhelmingly positive feedback about that versus just study guide questions” (personal communication, September, 2015), and further communicated that the student perspective factored into her decision to continue this teaching practice.

Katie spoke about the collaborative nature of online instruction. She perceived this as a way to not only obtain feedback about technological practice, but also as a way to improve her
own knowledge base. She referred to “communities of learners.” She spoke about how all participants in the online forum “learn together,” and how having a “broader community of learners” contributes to the pedagogical integrity of the course. Katie perceived the co-construction of knowledge as a valuable contribution to the learning process, and was clearly motivated further develop online instructional skills.

Elise experienced a different relationship between student input and pedagogy, and expressed a divergent point of view. She placed less value on the student perspective, and focused instead on student expectations. Elise remarked that:“ students expect to have power point handouts ready before class…they don’t even think they should be taking notes…they think everything should just be handed to them on a silver platter ” (personal communication, July 21, 2015). Elise appeared discouraged about the need to utilize certain innovations, and as a result, seemed indifferent to student opinion. The researcher sensed that this participant remained constrained by barriers, and therefore unable to clearly assess student points of view.

Faculty dialogue regarding educational contributions centered largely on the student experience. While participants recognized the personal benefits of technology integration, they maintained a constant focus on quality instruction, and the importance of enriching the educational environment. The researcher interpreted that this focus elicited personal and professional growth. As faculty insight into the positive attributes of ITAEP gave rise to feelings of satisfaction, enjoyment, and fulfillment, it also generated motivation to expand innovative teaching practice. Additionally, responsiveness to student feedback offered the guidance that some participants needed to move forward with technology-based teaching. Further, collaborative learning opportunities enabled faculty to appreciate different points of view, and perhaps reshape their own.
Respect for Program Integrity

The third superordinate theme that emerged from the data was respect for program integrity. In various ways, physical therapy educators ascribed meaning to the concept of employing technology in a manner that maintains and respects the pedagogical and ethical integrity of a clinically based curriculum. Faculty experiences integrating ITAEP helped them realize the importance of face-to-face interaction for the development of the psychomotor and affective skills that healthcare practitioners must acquire in order to achieve successful treatment outcomes. These skills are outlined in Appendix E, which shows an example of essential functions for student competency, across different domains of learning, in a physical therapy program. Cognizant of these functions, most participants perceived technology not as a primary vehicle for instruction, but as an adjunct to their teaching practices.

Interview responses converged around the idea of ensuring that ITAEP was used sensibly and appropriately. Faculty emphasized the concepts of balancing technology with traditional methodologies, employing it in a value-added manner, and avoiding using it simply because it was available. Sense making for some interviewees included questioning the role of technology in the physical therapy curriculum, including how and why technology should be used. Interviewees demonstrated that the issue of integrating ITAEP into teaching was one that they contemplated seriously and multi-dimensionally. Under the superordinate theme of respect for program integrity, two subthemes emerged: encouraged by in-person practices in physical therapy education, and intentional about change.

Encouraged by in-person practices in physical therapy education.

Participants who voiced their beliefs about the value of the live classroom experience did so emphatically, enthusiastically, and without reservation. Faculty shared their perspectives on
the importance of in person interaction in PT education, and talked about why they were motivated to teach in a face-to-face environment. When discussing any hesitation that she had about integrating ITAEP into her teaching, Maude responded: “I think my hesitation is that students will think that the face to face in the classroom and the lab, the hands on practice, can be substituted for an online based approach.” She went on to be a bit more specific as she said: “for example, somebody could think, well, I don’t need to go to the lab, I can just look at the video technique, and then I’ll practice the technique,” suggesting that video-based learning was inferior to live instruction (personal communication, August 5, 2105).

Maude additionally offered a unique perspective as she compared her experiences with face-to-face versus online discussion. She stated:

When you have an in class discussion group, you could have, let’s say, for one hour, a very efficient, effective use of time there. Everyone is in class, you can ask questions, interact back and forth, get information from the instructor, and that all takes place in a very limited period of time. The same discussion could be online, it might take place over the course of a few days, people lose their train of thought, you don’t really know how engaged the person on the other end of the computer is. They could be at home watching the baseball game and typing in their comments, without really thinking about it (personal communication, August 5, 2015).

Maude’s insights indicated that she had considered the impact of technology based learning across more than one domain of learning. Though her thoughts initially focused on skill acquisition in the psychomotor domain of learning, she was able to think more broadly about how cognitive and affective skills could be affected by removing the face-to-face component from teaching practice.
For several participants, the inclusion of hands-on, person-to-person contact to advance psychomotor and affective learning was unequivocally the most significant element of physical therapy education. Elmer’s dialogue reflected this idea clearly. He conveyed his apprehension regarding the integration of technology into clinically based courses that focus on the acquisition of manual skills. He explained how he views psychomotor learning as being “hands on stuff,” how he did not “want to see technology taking over a clinically based program,” and how, in a clinical course, there is “a lot of value to the professor in the front of the room” (personal communication, July 28, 2015). He additionally spoke about how technology integration, if not carried out wisely, could adversely affect the development of interpersonal skills in a cohort of future health care professionals. Based on his experiences with technology in the classroom, he offered the following perspective:

We are a patient centered major or profession, and what I don’t want, is to get lost in all this technology. What I feel is most important is people skills, and people talking to people, and interpersonal skills. I think that what has a tendency to happen with the increase in technology is that more students are behind a computer versus in front of it, talking to somebody, and I think that might be a detriment when they go on to their clinical affiliations, in having trouble with interpersonal skills (personal communication, July 28, 2015).

The need to preserve traditional components of a clinical curriculum was a concept that Elmer cycled back to a number of times during his interview. At the conclusion of his interview, when speaking about some of the positives of technology integration, he once again returned to the notion that physical therapy is “a patient centered profession,” and how he hoped that we never lost sight of “the interpersonal skills, the “dealing with people” (personal communication,
July 28, 2015). From Elmer’s point of view, preparing students for autonomy and an expansion in scope of practice was contingent upon using ITAEP judiciously and in moderation.

Elise, Jesse, and Dorothy passionately supported the need to teach and develop psychomotor and affective skills through traditional methodologies. Elise reflected on her experiences, and discussed the danger of abandoning these strategies:

I really still believe that physical therapy is still very much a hands on profession. I really think that PT students need to know what to do with their hands, or how to adapt the environment themselves, not just be able to talk about it. I think that what happens when you use a lot of technology, it encourages students and faculty to just use that as talk, talk, talk, and then when you have real live patients, it’s like, oh my God, what do I do? That’s my little bias and soapbox (personal communication, July 21, 2015).

With references to her “bias and soapbox,” Elise implied that integration of ITAEP was not congruent with some of the principles of physical therapy education. Her language suggested that she was skeptical about the surge of technology in education, and while her overall positions were consistent with those of the majority, her ability to engage in critical reflection about the use of educational technology may have been compromised.

Dorothy held similar beliefs about the importance of manual practice. She articulated her concerns in this way:

You have to be very careful, because you have to teach them hands on skills, and handling, and assessment skills, and physical assessment skills. I think that there is only so much of that you can do effectively online or on a mannequin, you have to do it with people, on people, and interact, and touch them, and hear them. So, I don’t think that
there is ever any way you could put the whole program online. EVER (personal communication, September 10, 2015).

Jesse reinforced Dorothy’s perspective, and further espoused the belief that there are limitations to effective technology use. Her experiences with technology in a health care curriculum were generated the following comment:

I think the affective stuff happens more with your interactions. I think it re-emphasizes psychomotor, but does not lay down the foundation for that. I think it waters it down if you’re too technology based, and I think it’s very specific to physical therapy, because it’s human interaction, it’s standing in front of someone, reading non-verbals, getting used to that, getting used to putting your hands on people. That’s what we’re training them to do, and that’s what we want them to do well, and using too much technology would actually water down your messaging (personal communication, September 24, 2015).

As licensed physical therapists for many years, and educators for over a decade, both Dorothy and Jesse possessed great insight into the essence of the physical therapy profession. Both participants also implied that a multi sensory educational experience is invaluable, and that the absence of the live classroom experience would be unethical.

In addition to the promotion of student growth and development, face-to-face education was seen as beneficial to the instructional process. Interviewees highlighted the value of being able to read body language and facial expressions when teaching. Elizabeth acknowledged the loss she felt during the process of creating an online educational module. She spoke about the disconnect she feels when students are not in a room with her, saying: “I feel that I connect better when I have people in person, and I find it more challenging online…I feel that you are
losing some of the body language, and reading the audience, and some of those pieces” (personal communication, September 10, 2015). Elizabeth worried about distancing herself from students through technology, and seemed concerned that the use of ITAEP had the potential to compromise the student-instructor relationship.

Jackie reflected upon the advantages of face-to-face education, particularly in smaller classrooms. She discussed the value of a more intimate setting, how it enhanced her personal style, and how it created a framework for a more captive student audience. She commented on how small group instruction allowed for “a more interactive” environment, in which “you can assess each person in conversation, and know how well they’re doing.” She thought about these interactive experiences, and noted: “they were kind of like a clinical situation brought to the classroom” (personal communication, September 8, 2015).

Though most enthusiastic about face to face pedagogy in the smaller classroom, Jackie advocated for live instruction on a larger scale as well. When contemplating the future of the entry-level physical therapy education, she communicated these thoughts:

I think each year I develop something new in technology. I don’t think it will ever take over everything, and I wouldn’t want it to. I would miss that personal interaction; I would miss the ability to look out at the students, and know that they’re getting it, or that they’re not getting it, and have that instant feedback (personal communication, September 8, 2015).

At several points during her interview, Jackie referred to the positive effect that face-to-face instruction had on her teaching style. She described the need to “flower” or embellish her responses to students in online environments. “There is not one response that I send back to a student that isn’t flowery,” she noted. “If I start out with, you might want to think about this, they
interpret that as negative. I don’t do that in the classroom, because they have the interaction with me. I don’t need to flower it like I do online” (personal communication, September 8, 2015). This thought process illuminated the notion that instructional candor and authenticity may be partially sacrificed in an online environment.

**Intentional about change.**

Firm in their beliefs that ITAEP must always be used to facilitate quality pedagogy, participants felt that a prudent and contemplative approach toward technology integration was paramount to ensuring that ITAEP is included in the curriculum in a balanced, meaningful, and appropriate way. This was especially important to interviewees whose assumptions about pedagogy and best teaching practice did not include parameters on technology use. Though steadfast in their beliefs that technology enhances in depth learning, interviewees shared concerns about how to integrate technology into different courses, and how it should be used to advance learning objectives. For most faculty, judicious and intentional implementation of ITAEP meant engagement in ongoing reflection about the extent to which technology should be used, when it should be integrated, and whether, in all cases, the effort required to restructure practice truly adds value to the educational experience.

Faculty felt that technology integration needed to serve a well-defined purpose. Thoughts shared by both Dorothy and Elmer gave this researcher the sense that these participants feel constantly pressured to consider technology use, even in situations where they find it inappropriate. Dorothy commented: “there is sort of a push institutionally to put things online…but I am really not convinced that you can learn a lot of the manual skills you need in PT that way.” She continued to advocate for a prudent approach to technology integration by saying: “There has to be a clear educational objective associated with technology, you’re not just
going to take students down to the sim lab and have them do transfers, and have them transfer
the mannequin because we have it here” (personal communication, September 10, 2015).

Elmer’s sentiments, which echoed Dorothy’s, revealed his frustration with contemporary attitudes about course design. He remarked:

What I get annoyed with in today’s education is online this and online that ….I just think people have to understand there are certain classes it’s going to work with and be successful with, and other classes, that, maybe it’s not a good idea (personal communication, July 28, 2015).

Jackie agreed, and cautioned that technology needs to be implemented as an “adjunct, as a way to engage students” (personal communication, September 8, 2015).

Elizabeth and Jesse, who recognized a mass movement toward technology integration, advocated for balance in educational practice. Elizabeth felt that:

Technology always makes me think of how, let’s say in our field, something comes out and everyone is going to use this, and what we find in the end is that’s it’s really one part….like all things, it has to be in balance (personal communication, September 10, 2015).

Jesse optimistically reinforced the concept of striking a balance between contemporary and traditional educational practices. She spoke about finding a “sweet spot” with respect to technology use. “Right now,” she commented, “technology is hot, so I think people are a little heavier on it than we should be. But I think there’s a lovely balance with that” (personal communication, September 24, 2015). While Jesse’s inflection seemed lighthearted, her message was serious, and synonymous with that of her colleagues: be careful not to use technology for technology’s sake.
Adding to the concept of balance was the idea that faculty should thoughtfully question their reasons for changing educational approaches. Ida eloquently stated: “I’m hesitant to jump on a bandwagon before understanding that what I’ve previously done is not as effective. That’s kind of a philosophical thing.” She additionally felt that prior to technology adoption, she needed to ask herself: “is it really better overall, beyond providing a repository for resources, and a mechanism for communication?” (personal communication, July 28, 2015). It was clear that Ida’s analysis of contemporary practices left her unconvinced that innovative technologies were more valuable than many traditional methodologies. Joseph, exhibiting similar concerns, felt that it was important to avoid a situation where he might reflect upon his work and say, “look what I did, I made it online, but now, it’s really the same thing as if I had given a lecture” (personal communication, August 4, 2015). He spoke about a particular innovation that had recently peaked his interest, and seemed capable of creating a dynamic learning atmosphere. Contemplating the use of this modality, he found himself posing the question: “What value are they getting? Are they really, truly getting more value out of it?” (personal communication, August 4, 2015). It was a question, like Ida’s, that prompted critical reflection through the use of internal feedback, and demonstrated engagement in the process of transformative learning.

In a less contemplative way, Elise, who admitted limited use of ITAEP, questioned the extent to which technology added value to a lesson. When discussing the ways in which technology fosters learning, she used the following example: “There are people who use clickers to do quizzing or to get a sense of what is understood…but you could also not use technology and get a student to write a one minute answer” (personal communication, July 21, 2015). This point of view represented a departure from that of many faculty members, who felt that personal response systems would be an asset to pedagogy. It did, however, raise the issue of whether
ITAEP was needed to accomplish certain educational objectives, or whether instructors could reach their goals without it. It was also congruent with Maude’s position on quality pedagogy. When asked about the influence of technology on education, Maude asserted that “regardless of technology,” instructors would be able to implement approaches such as problem based learning or hypothetical deductive reasoning, but that technology has supported these methodologies (personal communication, August 5, 2015). These responses suggested that a sound education is not technology dependent.

Elmer underscored the need to question one’s own teaching approach by pointing out that he did not always see a clear connection between technology and best practice. He talked about how he was sometimes “confused about how to implement it,” not because he couldn’t comprehend the operational aspect of technology use, but because he did not see how, by using technology, his lesson would be enhanced, or even comparable to what it was currently. He said that despite suggestions about how he could integrate technological practices, he was “not really positive on how to successfully accomplish that in a class that is clinically based” (personal communication, July 28, 2015). Jackie also spoke about establishing that clear connection, and how this sometimes occurred through failed attempts to use ITAEP. She specifically talked about the need to back away from technology at certain points. “We integrated I-pads a couple of years ago, and that didn’t go as seamlessly as I would have hoped. I think the I-pad was difficult to integrate. It’s a very individual thing; it doesn’t work well with the whole classroom” (personal communication, September 8, 2015). As she recounted this experience, Jackie realized the importance of careful scrutiny when trying to reform teaching strategy.

While respect for program integrity was the most nebulous of all themes, it was also the most enlightening. A strong message was associated with the emphasis on the value of face-to-
face learning; one that conveyed the notion that physical therapy is a specialized academic program that demands distinct teaching approaches, and cannot succumb to contemporary trends without careful consideration. This message was further underscored in dialogue that relayed concerns about overuse of technology in the curriculum, and the need to balance technology use with some of the traditional methods that target the acquisition of essential skills in the psychomotor and affective domains of learning. Jesse may have captured this feeling best, when she commented on the need to be cognizant of what physical therapists must be capable of when they reach the workplace. Similarly, Maude offered valuable insights on how face-to-face discussions may contribute to conversational skills and offer a dimension to learning that online education cannot. The need to question and evaluate the efficacy of ITAEP was magnified by fact that participants, irrespective of the number of years they had been teaching, did not always find best practices in education to be dependent upon technology. Furthermore, their beliefs and assumptions about good pedagogy were not always inclusive of a protocol for technology use.

Conclusion

In this chapter, findings from an interpretative phenomenological analysis were presented. Ten semi-structured, in depth interviews were conducted, transcribed, and analyzed, with the goal of understanding how physical therapy faculty make sense of their experiences integrating innovative technology-assisted educational practices into their curriculums. Analysis yielded three superordinate themes, and eight subthemes. Participants experienced an awareness of barriers, an appreciation for educational contributions, and a respect for program integrity. They made sense of barriers as unwelcome feelings, the influence of external factors, such as time, infrastructure, and operational issues, and a sense of dependence. Interviewees were appreciative of the contributions to education made possible by the integration of ITAEP. They
felt encouraged by the versatility of technology, and its ability to reach diverse learners, inspired by the cognitive development that occurred through technology based practice, and encouraged by student input that helped foster effective technology use. A respect for program integrity led participants to value the in person practices they considered integral to physical therapy education, and implement innovations in an intentional, judicious, and thoughtful manner.

A discussion of findings will be presented in the chapter that follows. This discussion will establish connections between the findings and published literature, and will explain the relevance of the findings to the theoretical framework of transformative learning. Additionally, the significance of these findings to future practice will be highlighted, and suggestions for future research will be included.
Chapter 5- Discussion of Findings

The purpose of this study was to uncover how physical therapy (PT) faculty make sense of their lived experiences integrating innovative technology-assisted educational practices (ITAEP) into their curriculums. The theoretical framework of transformative learning provided the underpinning for this study, and it served as the lens through which data was collected and text was analyzed. An interpretative phenomenological analysis, which allowed for exploration into faculty lived experiences on an individualized level, yielded rich responses, created opportunities for multidimensional interpretation, and gave rise to unique themes. The superordinate themes that emerged through analysis were 1) awareness of barriers, 2) appreciation for educational contributions, and 3) respect for program integrity. In this chapter, a discussion of the findings will be organized around each superordinate theme. It will begin with a focus on how each finding connects to the literature, and discuss the significance of the findings. It will then move to identify how findings collectively connect to the theoretical framework. Additionally, the researcher will discuss study limitations, propose recommendations for educational practice based on findings, and make suggestions for future research.

Awareness of Barriers

Subsumed under the superordinate theme of awareness of barriers were three nested subthemes: unwelcome feelings, influence of external factors, and sense of dependence. Though all participants in this study identified some type of barrier that influenced integration of ITAEP, the majority referenced the emotions or self-perceptions that they associated with technology use, and explained why these feelings complicated the process of incorporating technology into their teaching. While literature, to varying degrees, addresses and supports the findings of each subtheme, this study was able to add to existing knowledge regarding how barriers affect faculty
integration of ITAEP in higher education. Additionally, interview responses captured rich detail about how external factors hinder practice reform, and highlighted the sense of dependence that most participants experienced. This is noteworthy, as many studies on faculty integration of ITAEP have been conducted using quantitative methodologies, and have focused either on factors that influence technology adoption, or how technology has been used in teaching.

Qualitative research pertaining to faculty experiences integrating ITAEP is sparse, but meaningful. In a study that explored nursing faculty experiences with audio based technology, results indicated that participants felt unsettled and anxious about technology integration and experienced a degree of self-doubt through the beginning stages of the process (Freed, Bertram, & McLaughlin, 2013). A contemporary phenomenological study conducted by Blakely (2015) revealed that faculty identity as good teachers is central to a sense of who they are, and that personal feelings of incompetence, impatience, and frustration with respect to technology use sometimes threatened that identity. These studies align with earlier quantitative findings by Osika et al., (2009) who asserted that feelings of anxiety, fear, or competence associated with technology use strongly influence an instructor’s decision to incorporate technology into teaching. Kazley et al., (2013) similarly cited faculty comfort level with technology as an influential factor in practice reform. Given these results, parallels can be drawn between the collective findings of these authors and the findings of this researcher with regard to the subtheme of unwelcome feelings.

The qualitative nature of this study triggered the emergence of additional thoughts on internal obstacles. Though participants used terms such as anxiety and incompetence to describe their experience with barriers, they additionally spoke about lack of intuition as a personal impediment to technology use and alluded to insecurity associated with age. One participant
struck a self-deprecating tone in referring to herself as a “technology moron” (Katie, personal communication, July 20, 2015). While it initially appeared as though these experiences would significantly limit faculty from moving forward with technology integration, ultimately, this was not the case. As interviews progressed, and dialogue unfolded, it was this researcher’s interpretation that participants who were more forthcoming about personal barriers reflected more productively on different dimensions of technology integration and were then able to experience some degree of personal growth.

On two points, there appeared to be some divergence between claims made in the literature, and data presented in this study. First, literature posits that integration of ITAEP is, in part, shaped by faculty experiences that they should teach as they were taught in order to achieve best learning outcomes (McQuiggan, 2012; Osika et al., 2009). Participants in this study did not confirm this assertion. Faculty who expressed thoughts on best pedagogy did not assume that their own academic experiences were superior or even equal to those of today’s students. Second, research suggests that there is a shift in the instructor’s role when education is technology-based, and describes the instructor as a guide in a learner-centered versus a teacher-centered classroom (McQuiggan, 2012). With the introduction of technologies such as computer-generated virtual patients and i-Pads into a self-care course, McFalls (2013) talked about the role of the instructor as one of a facilitator versus a “sage on the stage” (p.3). Some faculty in this study similarly spoke about their current roles as facilitators, but they felt that their adoption of this pedagogical style had no relationship to the use of technology and would have occurred with or without the advent of ITAEP.

With respect to the nested subtheme of influence of external factors, there was considerable alignment between the findings of this researcher and those in published literature.
Ease of access and use, institutional support, available time to learn about technology and deliver technology-based course material, and need for professional development have all been reported in scholarly literature as factors that influence integration of technology based practices (Ajjan & Hartshorne, 2008; McQuiggan, 2012; Osika et al., 2009 Schols, 2012). Major (2010) conducted a metasynthesis of qualitative research on faculty perceptions about advantages and disadvantages of teaching online and found that faculty perceived increased demands on their time when teaching online, with the need to be more accessible more frequently. When reporting on the technology experiences of late career faculty, Blakely (2015) found that an investment in time incommensurate with return on student learning emerged as a key concept.

While faculty in this study did not experience the need to be continually available to their students, they did characterize usability as a significant barrier. Though participants did not explicitly talk about the relationship between investment in time and student learning, they did experience hours of technological problem solving that could not be linked to improved pedagogy. External barriers were clearly defined, as participants discussed issues with specific web browsers, or difficulties with specific technologies such as personal response systems. However, faculty responses also communicated a disparity between difficulties with technology integration, and perceived institutional desires and initiatives. Several participants were conscious of an institutional push to embrace and implement innovative technologies in their classrooms. At a time when universities are being pressured to spend more on hybrid or online learning, and information technology spending in United States educational institutions is in the billions of dollars (Greener, 2012; Spanier, 2012), this is not surprising. What is surprising, however, is that despite this initiative, participants felt that infrastructure in their institution remained intermittently unable to support their endeavors. As a result, many of their attempts at
technology integration were problematic. Higher education technology support specialists and administrators need to be cognizant of this, and work to minimize external barriers. Increased and streamlined communication on the topic of troubleshooting technology integration may help faculty more efficiently allocate time and resources, and simultaneously help them stay engaged in the process of technology integration, so that return on investment can be realized.

Interview data additionally helped to uncover deeper insights into the limitations posed by external barriers. It was disconcerting to discover that time spent on technology integration was experienced as time that was undervalued. It was a perception, however, that has been addressed in the literature. Nworie (2014) claims that creating innovative instructional material is not a priority of institutions and not recognized or sustained on a wide scale. This is discouraging for faculty who wish to innovate and advance pedagogy and creates concern that external obstacles will overpower and thwart intrinsic motivation to grow and develop as a professional. It may therefore be wise for institutions to revisit their missions when either looking at faculty merit, or deciding upon issues such as promotion or tenure.

The sense of dependence that was experienced by most participants in this study gave rise to a unique subtheme with respect to barriers. Though prior studies have not directly alluded to faculty dependence as an obstacle, literature has discussed the need for technology-based support and training that is tailored to specifically to faculty needs and able to foster independence. Qualitative inquiry has revealed that technology needs to be presented in a way that is meaningful and useful (Blakely, 2015). McQuiggan (2012) states that professional development models typically do not consider the knowledge, experiences, or uniqueness of most faculty, while Schols (2012) posits that a “one size fits all” approach to training is too often used (p.46) and that the personal needs and views of the educators are seldom considered. Ryan
& Bagley (2015) concurred, stating that professional development models must be more individualized, address internal barriers, and offer opportunities for practice, follow up, and reflection. Participant voices in this study echoed assertions made in the literature. Faculty shared concerns about their ability to follow through with suggestions that were given to them during technology information sessions. Likewise, they felt that technology based practices, as well as specific technologies used, need to be appropriate for the PT curriculum, and well understood by their users. Most significantly, faculty emphasis upon peer support and input reflects a contemporary attitude toward teaching that values teamwork above individual preference and demonstrates faculty commitment toward creating a cohesive network of effective instructors.

Interviewees additionally experienced a desire for interdepartmental collaboration, a factor that Keengwe et al., (2009) deemed important in helping to foster technology use. It is likely that customized and collaborative efforts could help faculty match innovative technologies to specific course content, and provide a platform to discuss and validate the internal and external obstacles that affect technology use. Ultimately, faculty could benefit from an approach to technology training that conforms with that proposed by Schols (2012), who advocates for teaching and learning that emphasizes the human element, not only the technological.

**Appreciation for Educational Contributions**

Three insightful subthemes, specifically, encouraged by versatility, inspired by cognitive development, and encouraged by student feedback, emerged to create the superordinate theme of appreciation for educational contributions. For all participants, appreciation was linked to awareness that these contributions were able to enrich the student experience in unique ways. Though not the focus of interview dialogue, faculty additionally expressed gratitude for the ways
in which the versatility of technology and student feedback helped them perform their jobs more successfully. Literature that discussed guidelines for both best practice in PT education and current trends PT education lent clarity to faculty experiences. Additionally, interpretation of faculty experiences also brought attention to issues and perspectives that were not emphasized in literature relating to ITAEP in the physical therapy curriculum, but have nevertheless been deemed relevant within the broader higher education arena.

One important issue that has emerged in higher education is the need to address the different learning styles that exist among students. The ability of technology to meet this need gave rise to a unique subtheme in this study; encouraged by versatility. With federal civil rights legislation that emphasizes increased accessibility to higher education for all citizens, approximately 11% of postsecondary students report having one or more disabilities, and may benefit from technologically based accommodations (Newman & Madaus, 2015; Phillips, 2015). In a number of postsecondary institutions, faculty development programs center on the use of pedagogical concepts such as universal design for instruction (UDI); a proactive approach to teaching that is inclusive of instructional strategies which are fashioned to benefit a broad range of learners (Rodesiler & McGuire, 2015). When designing a professional development process to help faculty integrate technology into teaching, Howland and Wedman (2004) pointed out that respect for diversity of thought, culture, learning styles and multiple intelligences is considered one of the seven principles of good practice for integration of technology in education. These priorities underscore the importance of flexibility in teaching, and stress the need for approaches that can be individualized. They also align with the priorities of participants in this study, who appreciated the different learning styles of their students and were encouraged by the ways in which audio, video, and online platforms addressed pedagogical needs.
Interview data from this study suggests that technology integration into the PT curriculum serves to advance the societal initiatives and institutional goals reported in the literature. By recognizing the individuality of learners, and the ways that ITEAP taps into that individuality, faculty perspectives were able to provide insightful evidence that can be added to existing literature. This evidence is also likely to be viewed positively by the Commission on Accreditation of Physical Therapy Education (CAPTE), and the American Physical Therapy Association (APTA). CAPTE, with proposed standards that call for a variety of instructional methods based the needs of learners (Commission on Accreditation in Physical Therapy Education, 2014b), can be encouraged by data that advocates the use of ITAEP to address various learning styles. Similarly, the APTA can be proud of faculty who adhere to their professional duty, and use different methodologies to optimize learning.

Participants in this study were energized by technology based educational platforms that contributed to higher order cognitive learning. Scholarly assertions that discussion boards create learner centered environments, increase student engagement, facilitate metacognitive awareness and development of self regulatory processes, and evoke insightful reactions (Comer & Lenaghan, 2013; Heejung et al., 2008; Ioannou et al., 2015) were corroborated by faculty in this study. Interviewees described these online forums as efficacious, and able to garner rich, deep and thoughtful responses that demonstrated in depth understanding of academic material. The claim that wikis promote knowledge sharing and support collaborative production of learning resources (Ioannou et al., 2015) was supported by a participant who felt strongly that interactive documents contribute to cognitive development. The problem-based learning approach, an evidence based method that helps improve retention of material, and asks students to apply
information in complex clinical contexts (Foord-May, 2006), was the inspiration for a software application that was hailed by one participant as an asset to the critical thinking process.

The employment of active learning techniques to improve knowledge acquisition, a concept experienced by one faculty member, has been recently validated in health professions literature. In a study conducted by Ruckert et al., (2015) innovative technologies were used to move PT material online, and create a learning environment characteristic of a flipped classroom. The authors concluded that technology could be used to engage learners in active, realistic social learning situations that prepare them for the demands of healthcare practice. They further espoused the ability of technology-assisted practices to promote critical thinking, reflection, collaboration, and higher levels of learning.

While evidence for technology based educational platforms was compelling and aligned with faculty responses, it was unclear whether faculty actually used research on ITAEP to help guide their pedagogical decisions. One participant specified that her impetus for choosing a particular technology-based practice was a colleagues’ enthusiasm for that modality. Several participants made reference to the idea that follow up research on an intervention might have been worthwhile. This would correspond with claims made by Comer and Lenaghan (2013), that discussion boards give rise to the most meaningful learning experiences when instructors use specific and deliberate strategies to craft forums that lead to productive discourse.

For faculty in this study, integrating ITAEP into their teaching modules meant respecting the student voice. Literature suggests that this practice is worthwhile. In mixed method research by Brooman, Darwent, & Pimor (2014), qualitative focus group data highlighted student perceptions of learning experiences that were used to create positive curricular change. Young & Hoering (2013) described how student comments were instrumental in shaping faculty
development activities. These studies, while valuable, were conducted through exploration and examination of student responses, versus analysis of faculty experiences. They were also challenged by Alderman, Towers, & Bannah (2012), who posit that while student evaluation surveys can be effective in guiding teaching practice, they are not always valid or reliable. The authors recognized students as valuable stakeholders in the university arena, but emphasized the need for a feedback system that develops a “clear analysis of the purpose and use of student feedback” (p.265).

While scholarly recommendations appear to support participant perspectives regarding a collaborative approach to teaching and learning, it is unclear whether the perspective of the student as a consumer should be one that heavily drives course design. Naidoo & Williams (2015) claim that the conceptualization of students as consumers has emerged over the past several decades in response to a decrease in public funding for higher education, and a resultant increase in student responsibility to meet tuition demands. This suggests that students expect their educational experience to be a return on investment, but does not suggest that they expect or wish to become executors of academic policy or practice. Therefore, while student contributions have been deemed important and valuable, they should not be viewed as the primary contributor to quality pedagogy. Additionally, they should be made more reliable with survey measures that are more appropriately conceived and designed.

Though not a theme or subtheme in this study, it is noteworthy that a number of interviewees expressed the idea student expectations played some role in integration of ITAEP. Several faculty suggested that they experienced technology integration as a means to comply with perceived expectations that students desire technologically infused academic environments. This perception was not entirely supported in the literature. Newland & Byles (2014) assert that
today’s students expect e-learning to be part of the learning experience, based partially on the premise that they learn differently through the simultaneous multiprocessing of various digital technologies. However, this viewpoint was challenged in a study conducted by Jackson, Helms, Jackson, & Gum (2011), who found that the majority of students they surveyed expected written handouts to be part of their education. It was also challenged in research that found students to be more engaged in learning when instructors communicated their interests and passions in traditional classroom environments (Lai & Savage, 2013). Faculty may have to therefore revisit their assumptions regarding technology use in the academic setting. Though students use social media exchanges a primary means of communication is social settings (Davis, Deil-Amen, Rios-Aguilar, & Gonzalez, 2015), their preferences in educational settings may be quite different.

**Respect for Program Integrity**

Faculty experiences led to perceptions that learning objectives and student competencies in physical therapy education could only be fully met if programs retained in-person teaching components. While literature shows some support for this finding, scholarly evidence is nebulous. Issues including, but not limited to time and space constraints, has prompted researchers to examine whether aspects of the PT curriculum can be delivered almost exclusively through ITAEP, without sacrificing program integrity.

Anderson & Tunney (2014) assert that the acquisition of certain technical skills in entry-level PT programs require faculty demonstration. This claim was challenged by Ford et al., (2005), who found video based learning to be as efficacious as live demonstration in teaching musculoskeletal special tests, and again by Moore and Smith (2012), when they arrived at the same conclusion using video podcasting to teach psychomotor skills for a basic skills course.
Carbonaro et al., (2008) used a virtual reality system to determine whether inter-professional team process skills could be equally developed in blended and face-to-face environments, and found that face-to-face interaction is an important part of the instructional format in developing team process skills, and cannot be abandoned. Though each of these quantitative studies are valuable and have the potential to influence practice, the authors’ conclusions can be further supported and augmented by the qualitative insights revealed in this study.

Interviewees in this study emphasized that psychomotor and affective skills are not separate entities in PT practice. They spoke passionately about how these competencies intertwine, and how aspects of human behavior influence handling skills, and drive adaptations that must often be made during assessment and treatment. Faculty who addressed the value of face-to-face educational practice had careers as physical therapists that spanned three to forty one years, indicating that even among newly licensed practitioners, the essence of the profession remains rooted in human relations and direct human contact. For faculty who were seasoned practitioners, there was a sense that didactic experiences need to set the stage for the conflicts and controversies that can arise in clinical environments.

The practice environment becomes an integral part of the student’s life before they graduate, when they encounter the clinical education portion of the curriculum. It is in this setting that the cognitive, affective, and psychomotor dimensions of learning come together to determine professional competency, and when one dimension is subordinated to the others, pedagogy is compromised (Anderson & Tunney, 2012). During clinical education, the majority of PT programs require that their students be assessed using the Clinical Performance Instrument (CPI) (Roach et al., 2012). The CPI is a valid measure of student performance, inclusive of diverse performance criteria that are considered essential for post-graduate autonomous practice.
Among the “red flag” items, or items considered foundational to practice, is the need to communicate in a way that is congruent with situational needs (Roach et al., 2012, p.418). Failure to perform satisfactorily in this domain warrants significant concern, and could jeopardize academic standing in the PT program. It is therefore easy to understand faculty perspectives on face-to-face teaching, as well as their commitment toward promoting affective domain learning during the didactic phase of the curriculum.

Faculty perspectives on the benefits of student-instructor relationships in live classrooms should not be diminished. It was the experience of most participants that achieving a sense of connectedness with students, and striving for genuine interactions when teaching were essential to quality pedagogy. Qualitative research has supported this perception, with findings that online teaching does not provide an adequate substitute for the sensory and expressive relationships that are valued by faculty (Major, 2010). In physical therapy programs, these findings have particular relevance, as live classroom opportunities can be perceived as further preparation for clinical education environments, where student and instructor work closely and cooperatively for a number of hours at a time. In-person practices additionally allow faculty to be more spontaneous and introduce clinical examples, which can enhance student comprehension in a live environment, but might be less effective or difficult to replicate in a technology-based classroom.

Likewise, it is important to recognize the importance of the learning community. Literature suggests that students value the chance to participate in synchronous, face-to-face discussion, where feedback is immediate, level of engagement is visible, and they are prompted to probe more deeply into subject matter (Keengwe, 2012; Lai & Savage, 2013). Despite these factors, advances in ITAEP are likely to continue and present ongoing challenges for faculty who seek to preserve time honored and arguably unparalleled practices.
Participants touched upon some of those challenges as they shared their experiences integrating technology-assisted educational practice in an intentional and judicious manner. Their philosophical reflections gave rise to several queries. How much is too much in terms of technology use in teaching? If I change my strategy to include technology based practice, will it be more effective than my current strategy? How much value do innovative technologies add to pedagogy? How does my course content influence the ways in which I can use technology?

Scholarly answers to these questions remain somewhat elusive. With respect to technology assisted educational practice, twenty first century literature has introduced readers to the overarching principles of meaningful technology integration, and sought to illuminate ways that specific technologies have contributed to pedagogy. Most published work has attempted to highlight the concept of technology as a platform for teaching and learning, rather than a tool for instruction, and has promoted ITAEP as a means of advancing meaningful constructivist learning and critical thinking (Lautenbach, 2014; Rowe et al., 2013; Velestianos, 2011). Only one contemporary study that explored nursing faculty experiences with virtual reality emphasized participant views regarding the need for thoughtful planning with respect to technology use. (Fiedler, Giddons, & North, 2014).

Interviewee reflections in this study, including the need to create a balance between innovative and traditional teaching methods, and the importance of ensuring that ITAEP adds clear value to pedagogy, add a new dimension to emerging literature. Given initiatives to increase and improve technology use among faculty, little attention has been paid to the potential negative ramifications of either overusing technology, or using it inappropriately. Luppicini (2012) posits that two of the most crucial elements of quality pedagogy, motivating students and explaining and demonstrating concepts, are not technology driven. The author maintains that the
removal of face-to-face contextual cues, and a diminished sense of social affiliation, may actually serve to weaken student motivation and learning. Ehrmann (2011) cautions against leaping from one technology to the next, and emphasizes the need to begin the integration process with innovations that are easy to understand, involve minimal time or risk, and are sustainable.

While these assertions offer some guidelines for judicious integration of technology, they do not fully address concerns of the participants in this study. It is possible that PT faculty, in their alternate role as hands on clinicians and compassionate caregivers, offer a unique perspective into how technology contributes to the quality of education. This perspective should serve as a framework for tackling certain issues pertaining to technology use in their courses. Participant experiences underscore the need for ongoing dialogue regarding how to best facilitate affective domain learning so that essential student competencies are met. They additionally create a compelling argument for faculty communities of practice with respect to technology integration. Collaborative thoughts, efforts, and dialogue can help to build sensible connections between the type of technology used, and the courses into which technology is integrated.

**Connection of Findings to Theoretical Framework**

This study, situated within the theoretical framework of transformative learning, was designed to determine the extent to which integration of ITAEP into the PT curriculum, for each individual participant, was influenced by critical reflection that affected frame of reference, and helped to generate personal growth. Figure 1 provides an illustration of the components of transformative learning that lead to personal growth.
Figure 1. The Process of Transformative Learning. This figure illustrates the process of learning that is guided by the principles of John Mezirow’s transformative learning theory.

Findings of this study revealed that for all faculty members, transformative learning was experienced to varying degrees. While no participants completely transformed their points of view, the majority demonstrated engagement in premise reflection, and at least four exhibited considerable personal growth as they implemented new actions by experimenting with innovative technologies.

To examine the way that transformative learning contributed to superordinate themes, it is worthwhile to look at how the psychological dimensions of Mezirow’s theory, frames of reference, critical reflection, and personal growth, relate to the themes that emerged. Mezirow asserts that a reflective process begins with a disorienting dilemma, and can only occur when we acknowledge feelings and thoughts, and identify attitudes (Mezirow, 1997; Schols, 2012). When
presented with technological innovations in academia, faculty in this study were confronted with the dilemma of how to align these innovations with principles of quality pedagogy, their existing ideas about effective teaching, and their current pedagogical strategies. The majority of participants in this study acknowledged that their frames of reference, specifically personal feelings, acted as barriers to integration of ITAEP. For these individuals, making sense of their experiences meant working to overcome those barriers rather than becoming limited by them. Therefore, they learned to become critical of their beliefs and attitudes through reflective thought.

It was the perspective of this researcher that no faculty member in this study harbored habits of mind, or predetermined assumptions, (Mezirow, 1997) that would preclude transformative learning. For example, no participant communicated the notion that technology integration was a threat to sound pedagogy or detrimental to the higher education environment. In only one transcript were points of view peppered with dissatisfaction and frustration and perceived as less amenable to change.

For participants who did not feel constrained by their feelings or beliefs, process reflection nevertheless became an important factor in understanding and coping with external barriers and identifying the need for support. Process reflection asks questions of the form: “Why could this happen? Why do I not know this?” (Schols, 2012, p.44). In the context of using ITAEP, these inquiries refer to issues regarding time, infrastructure, and inadequate assistance, and in this study, helped faculty make sense of their endeavors to reform teaching practice. For participants who reported both internal and external obstacles, reflection at this level required that acquisition of new information be integrated with past experiences and emotions. This can
be a difficult concept for many individuals, but was skillfully accomplished by interviewees in this study.

The concept of critical reflection formed the basis for the superordinate themes of appreciation for educational contributions and respect for program integrity. The majority of participants who contributed to this theme and its nested subthemes demonstrated that premise reflection was integral to integration of ITAEP into their teaching and to the process of making sense of their experiences. Premise reflection occurs when the situation itself is questioned through critical examination of existing values (Schols, 2102). This level of reflective thought was exemplified in data that highlighted the cognitive and pedagogical effects of ITAEP. It was further apparent in dialogue that discussed evaluating the value and role of ITAEP in teaching, and in participant statements that underscored the value of face-to-face practice in PT education. While many faculty statements advocated for preservation of traditional practices, and expanded existing points of view, they did so through introspective reflection on attitudes and beliefs about how technology should be utilized and when it is most appropriate.

Chu et al., (2012) characterized emancipatory learning as a process of self-discovery that occurs when critical knowledge of past experiences is stressed. Mezirow (1991) posited that emancipatory learning requires that all old meaning schemes be negated in favor of new insights. While it is difficult to assert that participants in his study truly experienced emancipatory learning, it is reasonable to conclude that continued practice reform will create a new reality for the majority of interviewees. Faculty who were encouraged by the versatility of technology, or in inspired by its potential to advance pedagogy, are apt to expand their experiences with ITAEP. As they do, internal and external barriers are likely to diminish, and emancipation from constraining thought and perspectives is likely to occur.
Nine of the ten participants in this study are likely to experience continued perspective transformation. For one interviewee, growth will only be sparked if more time is spent acknowledging and conquering internal barriers. Experimentation with new technologies, fueled by appreciation of educational contributions of ITAEP, will give rise to ongoing premise reflection and new meaning schemes for the majority of PT faculty. Complete transformation in points of view may not occur in all instances. Additionally, faculty adherence to their original beliefs regarding to face-to-face education may curtail some attempts to use technology. However, participants in this study appeared generally motivated to increase their understanding of ITAEP, and willing to continue revisiting their perspectives regarding the role of technology in their curriculum.

Limitations of the Findings

Findings of this study offer a unique contribution to literature that discusses integration of technology facilitated educational practice. It additionally offers a distinct window into how this topic relates to the field of physical therapy. However, study limitations exist and need to be acknowledged.

One limitation of this study is the fact that all interviewees were faculty members of the same institution and academic department. Though they all had different areas of expertise, and a variety of scholarly experiences, they all operated with the same resources and support systems available to them. While participant responses were authentic and descriptive, it is possible that insights from faculty in different PT programs would have contributed to deeper analysis and reflected more diverse perspectives.

Another possible limitation is the unequal representation of male and female participants. The program from which participants were recruited has a disproportionate number of female to
male faculty, and it was therefore problematic to recruit evenly with respect to gender. It should be noted that responses from male participants did not markedly diverge from those of their female colleagues. It is, however, difficult to predict how findings might have been altered with the presence of more male voices, and this is something that should be considered in future studies.

**Recommendations for Practice**

While many researchers aim to produce theoretical knowledge, there is a need for scholarly work that targets the needs and concerns of educators who are often in search of practical solutions to pressing problems. Quantitative studies, with their focus on timely and plentiful data collection, have historically served as great resources to practitioners and policy makers. Qualitative approaches, however, may be better suited for research in educational environments, with their emergent designs, focus on contextual factors, and use of rich, thick descriptions to capture data (Sallee & Flood, 2012). The inherent strengths of qualitative research allowed this researcher to explore lived experiences of PT faculty in a way that gave rise to detailed narrative, and led to insightful themes. Embedded within these themes was the concept that while integration of ITAEP is complicated by internal and external barriers, it also enhances the educational experience in ways that excite teachers and learners. This concept, underpinned by the need to recognize the value of traditional teaching methodologies, has clear implications for educational practice.

Educational recommendations will be of value to a number of stakeholders. It will not only help physical therapy faculty in all courses throughout the curriculum as they work to advance quality pedagogy, but it will also assist higher education administrators and technical support specialists in their quest to provide appropriate support and guidance to instructors, and
thereby enhance the experience of students. Students, the biggest stakeholders in the higher education arena, will be the ultimate beneficiaries of ITAEP that operate efficiently, and work to engender a high level of critical thought. The following suggestions emerged from analysis:

1. In response to the first superordinate theme of awareness of barriers- faculty experiences suggest that the creation of customized technology-based training initiatives, which can increase faculty self-efficacy and advance teaching goals (Blakely, 2015; Ryan & Begley, 2015), would be a worthwhile pursuit in PT departments. When exploring integration of specific technologies into the curriculum, it is important to consider data that reflects a desire for enhanced teamwork. Collaborative, interdepartmental training and professional development sessions, that follow structured and predictable meeting schedules, and enable faculty to pose individualized and targeted questions, could help decrease their sense of dependence. Additionally, faculty experiences emphasize the importance of reforming practice in such a way that innovations can be used in a seamless and productive manner across different courses, and throughout the curriculum.

2. Faculty experiences with internal and external barriers to technology integration suggest that technology-based communities of practice may be of value. Such forums would enable faculty to engage in positive and informal exchanges regarding technology use. They could additionally serve as non-threatening environments that allow faculty to address the unwelcome feelings that hinder their efforts to implement innovations, and instead, foster the feelings of security that will move them toward reform. Further, scholarly evidence that discusses the efficacy and appropriate use of particular technologies should also be gathered and presented so that strategies and guidelines for implementation can be recognized.
3. Participants in this study were encouraged by student feedback and perceived it as a valuable contribution to the educational process. Scholarly literature supports findings from this study, but suggests that many feedback systems have not been adequately developed, and are used inappropriately (Alderman et al., 2012). When garnering student input on ITAEP, it is important to be cognizant of faculty experiences, and recognize the extent to which that input might guide or shape practice reform. It may therefore be worthwhile to explore ways that student contributions can be made more valid and reliable, so that faculty are better able to evaluate technology-assisted practices and preferred learning methodologies, and develop a sound rationale for how technology should be used in any single course. Additionally, meaningful feedback could ensure that faculty efforts are focused on the implementation of practices that are most beneficial and appreciated. It may be worthwhile, as well, to investigate the efficacy of conducting learning styles assessments, as research shows that understanding students’ learning styles helps to better meet their educational needs, particularly in computer based learning environments (Cheng, 2014).

4. Initiatives to promote integration of ITAEP should consider faculty experiences regarding the need for judicious, intentional change. In order to respect and maintain program integrity, curriculum committees may want to develop technology-based guidelines that faculty can use when deciding how to restructure their courses. Sound guidelines could help create a balance between an institutional push to increase online learning opportunities, and faculty desire to preserve face-to-face learning time in PT curriculums. Additionally, they may be especially helpful in courses that are clinically based. The seven principles of good practice for integration of technology in education (Baumgartner, 2012) represents one instrument that may help faculty assess the appropriateness of technology in different learning modules, and could be used
uniformly among educators (Appendix F). This tool was derived from the seven principles for good practice in undergraduate education that have been enthusiastically adopted by many institutions, and have guided inquiry into the educational consequences of new technologies (Chickering & Gamson, 1999). Reflection upon both sets of principles suggests that in certain courses, decisions to move pedagogical discussions from face-to-face to online forums need to be carefully considered. Participants in this study suggested that learning in the affective domain may be very difficult to achieve with technology assisted practice, therefore, faculty must be discriminating about shifting course content that addresses affective competencies into online environments.

5. Given participant appreciation for educational contributions, and their satisfaction with the way that ITAEP addresses diverse learning styles, it may be helpful for PT faculty and administration to collaborate with disability resource centers, and learn more about the relationship between UDI and technology integration. Evidence suggests that UDI can reduce the extra steps often needed to create accommodations for students with learning differences, while simultaneously benefitting the greater student population (Black, Weinberg, & Brodwin, 2015). It would therefore seem advantageous to tap into the expertise of specialists that can assist instructors in improving upon course design through integration of ITAEP.

Recommendations for Future Research

Findings of this study identify avenues for future research. This researcher’s work highlights an issue not previously reported in the literature and could serve as an impetus for further qualitative work. It would be beneficial, through an alternate approach and different theoretical lens, to continue exploring ways that PT faculty experience or describe the process of integrating technology assisted educational practice into their teaching. Educators could benefit
from studies that look at the integration of specific technological mediums or gather perspectives on specific training initiatives, as information on these issues could help direct the trajectory of health care education.

Studies that look at the role of technology in PT education should not be limited to qualitative work that delves into faculty experience. The themes that emerged from this study suggest that certain aspects of PT education deserve greater attention. Participant concerns regarding the need to balance ITAEP with traditional approaches in PT education suggest that it would be worthwhile to examine the extent to which technology integration is of value in particular courses. This may best be achieved by building on the classroom restructuring efforts reported by Ruckert et al., (2015), and looking at the efficacy of a flipped classroom model in the PT education.

Faculty in this study felt that face-to-face instruction is a valuable and essential component of PT education. Their perspectives warrant further investigation. With a contemporary focus on how innovative methodologies can enhance pedagogy, the significance of the live classroom appears to have diminished. It would be useful for researchers to gather PT student perspectives on how or why in person classroom experiences are of value to them. It would also be valuable to conduct an experimental study that compares live to online discussions, so educators develop a better understanding of how to build content in discussion forums. Additionally, to further enhance curricular design, it would be interesting and advantageous to gather evidence that either confirms or refutes faculty perceptions that affective domain learning cannot be satisfactorily achieved via ITAEP.

With an emphasis upon the student experience, participants formed a conceptual bridge between technology integration and respect for different learning styles. While some research in
PT education has looked at the influence of learning styles on particular practices, it would be wise for future work to continue to examine the relationship between specific technology assisted practices and student learning styles. Results of such studies may be useful for administrators seeking to implement new graduate or certificate programs.

The technology-assisted higher order learning that was experienced and appreciated by participants in this study may be of value beyond the didactic portion of PT programs. It would be beneficial to examine or explore the ways in which ITAEP could promote knowledge sharing and construction during the clinical education portion of the curriculum. Scholarly inquiry on this “signature” piece of PT education (Anderson & Tunney, 2014, p.62) could meaningfully shape student experiences. Furthermore, research findings could identify ways for students to engage in complex and collaborative problem solving that is centered on real life clinical examples and scenarios.

Gwyer, Hack, Jensen, Segal, & Boissonnault (2015) state that “the profession of physical therapy relies on educational researchers to educate clinical PT’s and create knowledge that will enhance the education of students and the practice of clinicians” (p.3). The significance of this assertion cannot be minimized. As we prepare our students for clinical practice in a healthcare system that is dominated by policy and practice reform, we must ensure that they are educated in a manner that fosters insightful and scholarly thought.

**Conclusion**

This study was guided by the following research question: How do physical therapy program faculty make sense of their lived experiences integrating innovative technology-assisted educational practices into the didactic component of their curriculums?
Through the theoretical framework of transformative learning, researcher inquiry was able to determine how frames of reference, critical reflection, and personal development influenced faculty integration of ITAEP. By means of interpretative phenomenological analysis, the meaning of participant experiences was ascertained. For faculty in this study, making sense of their experiences meant gaining awareness of the barriers associated with integration of ITAEP, appreciating the various educational contributions associated with ITAEP, and respecting program integrity with all efforts to integrate ITAEP. These concepts became the three major themes extracted from interview data. Themes were present to some extent in scholarly literature, however, much of the literature reflected findings from the broader higher education arena rather than educational publications specific to physical therapy. With respect to certain subthemes, data yielded connections between concepts that were either not prominent or emerging in current literature.

Literature confirmed this researcher’s findings regarding two of the three subthemes nested within the superordinate theme of awareness of barriers: unwelcome feelings, and the influence of external factors. The qualitative nature of this study was able to add depth to existent literature by uncovering the subtheme of dependence. Additionally, the interpretative phenomenological approach engendered richer responses with respect to participant feelings, and revealed informative details about how external barriers affected technology integration initiatives.

With respect to the second superordinate theme of appreciation for educational contributions, literature supported participant experiences regarding the ability of ITAEP to facilitate higher order cognitive learning. Regarding the subtheme of encouraging versatility, faculty responses generated new information. While research can be found that discusses
technology use for students with learning differences, and studies have been conducted that
tie specific technologies to specific learning objectives, publications that look at the broader
calendar of technology as a platform to address learning styles among a diverse higher education
student population was difficult to locate. It is noteworthy that while scholarly literature
concurred with participants in this study with respect to student feedback, it simultaneously
asserted that feedback mechanisms are not always sound. This claim may have an impact on both
policy and practice.

The superordinate theme of respect for program integrity, and the subthemes of
encouraged by in person practices in PT education, and intentional about change, were
peripherally addressed in some literature, but not central to most publications on technology
integration. In literature that discussed the use of particular technologies in PT coursework,
findings suggesting that ITAEP is equivalent to live instruction complicated the findings from
this study, in which participants found unparalleled value in face to face practices. Information
questioning frequency of technology use, or its applicability to certain material, was scarce.

Analysis revealed that all participants experienced some degree of transformative
learning during the process of technology integration. Though beliefs and attitudes were
identified as barriers, faculty were able to engage in meaningful critical reflection about their
Teaching practices, and minimize the challenge presented by their points of view. For several
participants, premise reflection was able to give rise to personal growth, and positively reform
their practices.

This researcher’s findings prompted several recommendations for educational practice.
These included the need to establish criteria for customized training and support sessions, initiate
targeted informational surveys, set parameters for integration of technologies, develop strategies
to address diverse learners, and build a technology based learning community for clinical education students. Additionally, study results generated potential paths for future research. Further qualitative study on PT faculty experiences with specific technologies, and scholarship centered on technology prevalence, benefits of in person practice, and influence of learning styles, could all enrich educational theory and practice.

Twenty first century technologies have revolutionized the higher education landscape. As a result, faculty have been prompted to change their pedagogy in ways that require both a critical eye and an open mind. This study has illuminated some of the experiences and challenges that have faced educators as they have worked to reshape their practices through reflection and self-discovery. It is the hope of this researcher that as innovations continue to emerge, the findings presented in this paper will serve as guidelines for faculty who are striving to provide valuable pedagogical experiences for their students and simultaneously working to broaden their horizons on teaching and learning.
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Appendix A - IRB Approval

Northeastern

NOTIFICATION OF IRB ACTION

Date: June 30, 2015  IRB #: CPS15-06-01
Principal Investigator(s): Shannon Alpert
Pamela Donlan
Department: Doctor of Education Program
College of Professional Studies
Address: 20 Belvidere
Northeastern University
Title of Project: Faculty Lived Experiences Integrating Innovative
Technology-Assisted Educational Practices into an Entry-Level Physical Therapy Curriculum: An IPA
Participating Sites: Northeastern University PT program permission forthcoming
DHHS Review Category: Expedited #6, #7
Informed Consents: One (1) signed consent form
Monitoring Interval: 12 months

APPROVAL EXPIRATION DATE: JUNE 29, 2016

Investigator's Responsibilities:
1. The informed consent form bearing the IRB approval stamp must be used when recruiting participants into the study.
2. The investigator must notify IRB immediately of unexpected adverse reactions, or new information that may alter our perception of the benefit-risk ratio.
3. Study procedures and files are subject to audit any time.
4. Any modifications of the protocol or the informed consent as the study progresses must be reviewed and approved by this committee prior to being instituted.
5. Continuing Review Approval for the proposal should be requested at least one month prior to the expiration date above.
6. This approval applies to the protection of human subjects only. It does not apply to any other university approvals that may be necessary.

C. Randall Colvin, Ph.D., Chair
Northeastern University Institutional Review Board

Nan C. Regina, Director
Human Subject Research Protection

Northeastern University FWA #4630
Appendix B- Recruitment e-mail

Dear faculty member and colleague:

As many of you know, I am in the process of completing a Doctor of Education degree at Northeastern University. In partial fulfillment of my doctoral studies, I am inviting you to participate in a research study, which is titled:

*Faculty Lived Experiences Integrating Innovative Technology-Assisted Educational Practices Into an Entry Level Physical Therapy Curriculum: An Interpretative Phenomenological Analysis*

I am recruiting participants who meet the following criteria:

a) Faculty members who teach within an entry-level physical therapy program  
b) Possess either a master’s degree, clinical doctorate in physical therapy, or other doctoral level degree  
c) Have 3-5 years experience teaching, with some responsibility for course design

Faculty who agree to participate will be asked to do the following:

a) talk with me one-on-one either by phone or in person to share some general information about your professional background  
b) Meet with me one-on-one, at a location of your choice, to participate in a confidential 60-70 minute interview about your experiences integrating technology assisted education practices into your courses  
c) Read an e-mailed copy of the interview transcription, and let me know, based on any reflective thoughts that were recorded following our interview, if you would like add or clarify anything.

Participation is voluntary, and you are free to withdraw from the study at any time. Faculty who participate in the interviews will receive a $20 Visa gift card.

If you would like to participate in this study, please send me an e-mail confirming your interest. I will subsequently answer any questions you may have, and then send a return e-mail with a consent form for you to sign. At that time, we can establish a time and location for our first conversation.

I will be happy to answer any questions you have about the study. You may contact me at 508-250-5271, or at donlan.p@husky.neu.edu.

Sincerely,

Pamela Donlan
Appendix C - Informed Consent

Northeastern University, College of Professional Studies, Graduate Programs, Higher Education Administration

Name of Investigator(s): Principal Investigator- Dr. Shannon Alpert, Student Researcher-Pamela Donlan

Title of Project: Faculty Lived Experiences Integrating Innovative Technology-Assisted Educational Practices Into an Entry Level Physical Therapy Curriculum: An Interpretative Phenomenological Analysis

Informed Consent to Participate in a Research Study
We are inviting you to participate in a research study. This form will tell you about the study, but the researcher will explain it to you first. You may ask this person any questions you may have. When you are ready to make a final decision, you may tell the researcher if you want to participate or not. If you decide to participate, the researcher will ask you to sign this statement and will give you a copy to keep.

Why am I being asked to take part in this research study?
You are being asked to participate in this study because you are a faculty member who teaches within an entry-level physical therapy program.

Why is this research study being done?
The purpose of this study is to make sense of physical therapy faculty lived experiences with innovative technology-assisted educational practices in an entry-level physical therapy curriculum. The intention of the researchers is to learn about faculty perceptions and insights regarding technology assisted educational practices, and their influence on pedagogy.

What will I be asked to do?
If you decide to take part in this study, I will ask you to answer a series of open ended questions about your experiences integrating innovative technology-assisted educational practices into your courses, which will be inclusive of your perceptions about technology assisted educational practices.

Where will this take place and how much of my time will it take?
The initial phone call or face-to-face meeting should take no more than 15-20 minutes. You will subsequently be interviewed at a time and place that is convenient for you. The interview will take about 60-70 minutes. Two to three weeks later, you will receive an e-mailed copy of the interview transcription, which I will ask you to read. You may then let me know if you would like to add or clarify anything.

Will there be any risk or discomfort to me?
There is no foreseeable risk or discomfort anticipated with your participation in this study.
Will I benefit by being in this research?
There will be no direct benefit to you for taking part in this study. However, the information gleaned from this study may provide avenues for future research on this topic, and may assist faculty members as well as other professionals with technology integration and training initiatives.

Who will see the information about me?
Your part in this study will be confidential. Only the researchers in this study will see the information about you. All data will be transcribed and analyzed by the primary researcher. Pseudonyms will be used to keep your name and the name of the institution confidential. No reports or publications will use information that can identify you in any way. Efforts will be made to prevent anyone other than the researchers from connecting individual subjects with their responses.

All signed consent forms and hard copy data will be kept in a locked safe, and unavailable to anyone other than the researchers. Electronic data will be stored on a flash drive and a hard drive that is only accessible to the researchers.

Can I stop my participation in this study?
Your participation in this study is completely voluntary. You may voluntarily withdraw from this study at any time.

Who can I contact if I have questions or problems?
If you have questions about this study, please feel free to contact Pamela Donlan, at 508-250-5271, or donlan.p@husky.neu.edu, the person mainly responsible for this research. You can also contact Dr. Shannon Alpert at s.alpert@neu.edu.

Whom can I contact about my rights as a participant?
If you have any questions about your rights in this research, you may contact Nan C. Regina, Director, Human Subject Research Protection, 960 Renaissance Park, Northeastern University, Boston, MA, 02115. Tel: 617.373.4588, Email: n.regina@neu.edu. You may call anonymously if you wish.

Will I be paid for my participation?
You will be given a $20 Visa gift certificate at the conclusion of the interview process.

Is there anything else I need to know?
Pamela Donlan, the primary student researcher, is an adjunct faculty member in the Department of Physical Therapy, Movement, and Rehabilitation Sciences at Northeastern University.
I agree to take part in this research

Signature of person agreeing to take part ________________ Date ________________

Printed name of person above

Signature of person who explained the study to The participant above and obtained consent ________________ Date ________________

Printed name of person above
Appendix D- Interview Protocol

The purpose of this study is explore how you make sense of your lived experiences integrating innovative technology-assisted educational practices (ITAEP) into your work. These questions are to help gain an understanding of your experiences with ITAEP by interpreting how they make sense to you.

Interview Questions:

1. When your first started teaching, what were your assumptions about pedagogy? How have they changed over time?

2. What prompts you to use technology in your teaching?

3. What has it been like to integrate technology into your teaching?

4. Can you tell me a story about a time that you integrated technology into your teaching, and felt that it was effective?

5. How has the transition to the use of technology in teaching made you feel?

6. How would your describe the ways in which your use of educational technology has impacted student learning?

7. How would you describe any hesitation that you may have had or currently have regarding the integration of ITAEP into your teaching?

8. How do you think technology use has influenced your approach to teaching?

9. Can you describe how your experiences using technology have affected your beliefs about integration of these practices into the curriculum?

10. Moving forward, how do you believe that technology-assisted practice can be of value to you in your teaching endeavors?
Appendix E

Essential Functions for XXXXX University Physical Therapy Students.

Physical therapy students must be able to perform, with or without reasonable accommodations, each of these essential functions in order to fully participate in our program and successfully complete the requirements for the DPT.

Cognitive Functions

1. Comprehend, integrate and analyze complex information from the liberal arts, basic sciences, mathematics, psychological and clinical sciences and apply this information to professional course work.

2. Comprehend, integrate, analyze and apply information from written materials, demonstrations, sessions, and real and simulated patients

3. Effectively utilize information obtained from classroom, laboratory, and experiential learning, and real and simulated patients

4. Access, critique and analyze information from the professional literature, clinical experience and patient preferences to provide evidence-based interventions.

5. Educate others including but not limited to: patients, students, colleagues, peers, the general public/community health groups and other health professionals in a variety of venues using appropriate teaching and learning methods

6. Determine the physical therapy needs of any patient with movement dysfunction

7. Properly document physical therapy assessment, plan of care and produce any other documents necessary for any patient receiving physical therapy services.

8. Demonstrate management skills including strategic planning, organizing, supervising, delegating, managing resources, and adhering to legal/regulatory requirements

9. Evaluate patient or community needs and create programs of prevention and health promotion in a variety of client population and settings

10. Advocate for patients and members of the community to improve access to health care and health outcomes.

11. Analyze the impact and influence of lifestyle, socioeconomic class, culture, beliefs, race and abilities of patients and colleagues to develop appropriate and effective interventions.
12. Identify and analyze factors which affect the overall health of society, its healthcare policies, access, delivery, and quality.

13. Assess environmental and personal factors that serve as facilitators or barriers to full community participation based on patient’s goals.

14. Screen for psychosocial factors that affect patient function such as substance abuse, domestic violence and psychiatric conditions, and provide appropriate interventions

15. Provide interventions for patients/clients and the community at large that is culturally appropriate and respectful of their preferences.

**Affective and Communication Functions**

1. Establish professional, respectful, empathic relationships with individuals from a variety of lifestyles, cultures, ages, socioeconomic backgrounds and abilities, based on mutual trust.

2. Develop and maintain effective working relationships with professional colleagues, peers, patients/clients, families, and the general public.

3. Work effectively as part of an interdisciplinary team.

4. Effectively communicate with patients, families, colleagues and others by providing information that is appropriate for their culture, level of knowledge, and health literacy.

5. Identify the psychosocial impact of movement dysfunction and disability on the client and family; integrate these needs into all patient intervention or personal interactions.

6. Meet externally imposed deadlines and time requirements.

7. Effectively and consistently manage personal stress and the stress of others.

8. Effectively attend to people, information, and tasks in a complex, highly stimulating environment.

9. Practice in a safe, ethical, and legal manner, following guidelines as established by federal, state, and local law, the University, clinical facilities, the APTA, and related professional organizations.

10. Demonstrate responsibility for self-assessment and the development of a life-long plan for professional growth and development
11. Accept responsibility for the consequences of one’s own actions.

12. Respond to medical crisis and emergencies in a safe, calm, professional manner.

13. Speak and write effectively in English to convey information to other individuals and groups.

14. Understand and interpret the verbal, non-verbal, and written communications of hers and respond in an appropriate, professional manner.

15. Place the needs of the patient before the needs of the therapist.

**Psychomotor Functions**

1. Safely, reliably, and efficiently perform appropriate physical therapy procedures to examine the functional skills and abilities of patients with motor dysfunction across the lifespan consistent with currently established best practices.

2. Safely, reliably, and efficiently perform physical therapy interventions consistent with currently established best practices for patients across the lifespan.

3. Effectively and consistently practice standard precautions.

4. Effectively perform CPR and emergency first aid.

5. Read instructions, manipulate and operate physical therapy equipment and monitoring devices.

6. Demonstrate appropriate body mechanics and react safely and appropriately to sudden or unexpected movements of patients.

7. Demonstrate the ability to work in an environment that requires physical activity and mobility in a way that does not compromise patient or therapist safety.
Appendix F.

*Seven principles of good practice for integration of technology in education.*
(Baumgartner, 2012)

1. Good practice encourages contacts and communication between faculty and students.

2. Good practice recognizes that learning is social and develops reciprocity and cooperation among students.

3. Good practice uses active, inquiry-based learning techniques and meaningfully-engaged time.

4. Good practice given prompt feedback and encourages metacognition-reflections about one’s learning.

5. Good practice communicates high expectations by encouraging the development of students’ authentic, real-world problem-solving and decision-making skills.

6. Good practice develops content knowledge and deep understanding by promoting student connections to prior knowledge and other disciplines.

7. Good practice respect diversity of thought, culture, learning styles, and multiple intelligences in enriching student learning experiences and in student demonstrations of learning.