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Chalee R Engelhard, hereby submit this original work as part of the requirements for the degree of Doctor of Education in Curriculum & Instruction.

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A Venture into Online Learning

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Abstract

The study’s purpose was to uncover how Clinical Instructor (CI) best practices can be learned and maintained over time through use of an online learning environment. The study's three research questions centered on CIs' perceptions of the effectiveness of an online learning module, DPT students' perceptions of CI mentoring skills in providing an enriched learning environment, and the level that CIs would be able to maintain module-taught best practices after a nine-week inactive period. The study’s background begins with Vision 2020 where the American Physical Therapy Association foresaw the need to require a clinical doctorate as the entry-level degree for physical therapists (PT). As a result, the academic rigor of PT programs was elevated and length of clinical experiences was increased. This resulted in a strong reliance on the Internet as a way to send larger amounts of information to CIs on a timelier basis. These events led to the identification of a gap between CI needs and evidence-based, CI best practices. Studies found that there were few online education courses with a clinical education focus. Additional factors that contribute to the ever-widening gap include inconsistent CI knowledge of how to work with students’ professional behavior issues, student supervision, and lack of evidence-based, CI best practices. The participants of this study consisted of two groups, DPT students and CIs who served as mentors for the students’ third clinical rotation. CIs completed an online module prior to the start of a nine-week rotation. Immediately following the rotation, the CIs took a delayed post-test and participated in a focus group. DPT students completed a feedback form to assess the CIs’ performance. Following a nine-week inactive period, the CIs completed a follow up worksheet that assessed their ability to maintain module-taught best practices. This mixed methods study utilized SPSS to analyze the quantitative data including the use of Wilcoxon Signed Ranks and Mann Whitney U tests. Grounded Theory was used to analyze the qualitative
aspects of the study. Cronbach's alpha tested for internal consistency and found the reliability of the instruments to be at the acceptable to good level. The Kappa statistical analyses found the data to be at "substantial" to "almost perfect" levels. The findings indicated that by taking the online module CIs perceived an improvement in the quality of their mentoring skills in the clinic. According to the students, treatment group-CIs did not provide better mentoring during the clinical rotation compared to the control group-CIs. However, the students that had the treatment group-CIs did report the use of module-taught best practices. Lastly, treatment group-CIs did maintain best practices with use of the module-taught best practices as a key resource after a nine-week inactive period. In summary, study results indicated that the participating CIs were able to maintain best practices using immediacy in education, distributed clinical practice, and reflection. Due to the sample size, generalization of the study results to the CI population is not supported. More research in this area is needed to help close this gap in clinical education.
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“Sometimes you must choose between what is right and what is easy.” This quote from J.K. Rowling was the opening statement in my application for the Instructional Design and Technology program. It conveys my decision to obtain my EdD over any other terminal degree. As each day passed, validation of the right choice occurred. The depth of learning cannot be overstated which is rivaled by the immeasurable support from my family, friends, colleagues, and the researchers that came before me. To attempt to name each person would be an act of futility, but to all who gave me strength, energy, and determination when mine had dwindled, thank you for your time, guidance, and support.

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Chapter 1 Introduction

Background

As PT programs across the nation come into compliance with the American Physical Therapy Association (APTA)’s Vision 2020, greater clinical education requirements are becoming the norm (Weatherbe, Peatman, Kenney, Cusson, & Applebaum, 2010). As a result, Doctor of Physical Therapy (DPT) students are required to spend more time in the clinic in order to learn how to contend with the increasing complexities of today’s healthcare environment. DPT curricula frequently require periods of didactic education and clinical training. This often requires DPT students to spend as much as one third of their academic career in a clinical environment. Students in the clinic are mentored by Physical Therapists (PTs) serving as Clinical Instructors (CIs) who have varying levels of experience as well as differing entry-level degrees. This variability has the potential to complicate the process of clinical education, not only for the CI but also for the DPT student. Recker-Hughes, Pivko, Mowder-Tinney, and Brooks (2008) found that CIs often feel they do not know enough about how to mentor DPT students and have a desire to know more. Additionally, Housel and Gandy (2008) reported that CIs may have limited access to CI-specific educational resources and lack awareness of the resources that are available. Therefore, they tend to rely upon on-the-job training in order to understand how to instruct students. Even CIs who are aware of CI-specific educational opportunities have the perception that there are not enough available (Recker-Hughes, Brooks, Mowder-Tinney, & Pivko, 2010). These findings underscore the difficulty that PT programs experience as they attempt to educate CIs about the new DPT curriculums, student supervision guidelines, and how to successfully deal with student behavioral issues that may occur. The somewhat stagnant and limited training resources available to CIs compared with the increasing volume of student
clinical experiences, and the increasing expectations of improved student clinical outcomes, suggests the need for an accessible and appropriate CI training program.

**Web-based education.** The traditional path of information sharing with clinical sites consists of putting updates into the mail resulting in a slow information exchange that is cumbersome and costly. The Internet has become a faster, more economical and efficient alternative route of sharing this information. Thus, some PT programs have chosen to send emails and post documents to websites in an effort to disseminate information more expeditiously. Web-based training is an underexplored method of providing continuing education courses that aid in integrating recent changes to education requirements into the clinical environment (Strohschein, Halger, & May, 2002). To illustrate this point, CIs have specifically identified that there are not enough web-based courses available (Recker-Hughes et al., 2010). However, developing an effective, online course requires a knowledge base in web-based education strategies in order to meet specific learning objectives. Handling accessibility, navigation, and technological issues requires expertise that goes beyond the actual content development of the course. Many PT educators do not have this level of expertise. A multimedia approach where the learner can have an interactive experience using several physiological senses provides the foundation of a successful web-based course and a successful learning experience.

**Students’ perspective.** Clearly, CIs need to have quality learning opportunities, but so do their students. However, the areas for development to aid the student in having a successful outcome may differ between the CI and the student. Students often believe that competency in their psychomotor and cognitive skills are the only skill sets needed to prepare them for obtaining their license to practice. Thus, when they are able to perform the mechanics of day-to-day patient care management in clinic, they feel that the majority of their learning is complete.
Nevertheless, Strohschein et al. (2002) found that students’ affective behaviors might stand in the way of successfully completing their academic careers. These affective (subjective) behaviors may manifest themselves in clinic in various ways including poor stress management, inability to implement instructor feedback, or inefficient skills in utilizing downtime appropriately to name a few. May, in collaboration with Straker and Foord-May (2002), created the generic abilities in order to assist clinicians with a way to address student affective behavioral issues. The generic abilities provided clinicians and educators a template for promoting student autonomy in resolving affective behaviors through identification of specific behavior issues, writing a plan, and setting goals with timeframes in order to reach entry level performance. Hayes, Huber, Rogers, and Sanders (1999) validated the need for generic abilities. These researchers concluded that CIs prefer to correct students who are having objective clinical issues, which may include issues such as hand placement, knowledge base, or selection of special tests. By contrast, the same study found CIs avoided addressing student issues such as punctuality, constructive use of feedback, and stress management (Hayes, Huber, Rogers, & Sanders, 1999). Through implementation of the generic abilities, CIs were able to evaluate the subjective behaviors with an objective plan that was student driven and approved by the CI. The students were empowered to self-monitor their growth in the affective domain allowing the CIs to serve as a facilitator of student development.

In 2010, May, Kontney, and Iglarsh (2010) revisited the generic abilities. Because of this research effort, the generic abilities evolved into the Professional Behaviors. The Professional Behaviors provide a framework for handling behavioral issues that come with a doctoral student in clinic. The revised tool still requires the CI to address a problem as it arises, establish a student-driven plan, implement, and re-evaluate it so that the student can successfully modify
the behavior and ultimately complete their clinical experience. Therefore, the Professional Behaviors tool allows the CI and the doctoral student to make assessments and implement strategies before adverse behaviors erode the clinical environment.

**CIs’ perspective.** While recognizing that students are the major contributor to the outcomes of their clinical experiences, the CI still has the responsibility to educate the student to their fullest potential. Cole and Wessel (2008) outlined six steps that a CI could follow to enrich a student’s clinical experience. These steps suggested that DPT students value CIs more who not only involved them in patient care and challenged them in their learning but also modeled professional behavior (Cole & Wessel, 2008). Furthermore, Kelly (2007) stated the exemplary CI employs active learning and reflection. Students in these studies felt that if a CI consistently followed these guidelines, the quality of the rotation could dramatically improve. However, the statement also implies that a CI is cognizant of how to appropriately challenge and prepare students. Unfortunately, this is not always the case. Not all CIs have the instructional knowledge base to be able to comply with these guidelines.

This brings into question what the best practices are for educating CIs so that they are able to reach this level of quality mentoring. Ross (2001) did not find a strong link between CI education and positive student outcomes. This intensifies the quest for identifying appropriate guidelines. Hence, CIs are being asked to challenge and mentor students in clinic and yet a best practice guideline does not exist neither for educating CIs nor for CIs in how to best mentor students.

Another challenging aspect of CI education is the location of the CIs. CIs may be located anywhere across the United States. If these CIs were like typical on campus, faculty members then onsite, faculty development courses would be available to them. These traditional-setting
classes promote the participants’ ability to confirm their learning of newly introduced instructional designs and educational tools through verbal and non-verbal means. An additional advantage of face-to-face faculty development is the networking between CIs, which can aid in creating a larger toolbox of educational resources. However, since most CIs are not local, face-to-face workshops, courses, and assessments are not possible. This is problematic for any DPT program in that it suggests that remotely located CIs do not have access to the education, training and assessments as those CIs who are nearby. As a matter of professional development, local and non-local CIs deserve the same educational opportunities. Thus, these CIs require an educational venue similar to distance-learning students where they get the same educational opportunities as on-campus faculty, but the mode of information transmission occurs differently to accommodate for the inability to meet on campus.

What complicates the situation even further is that some CIs may have minimal awareness of the basic tenets of our professional association. This is in contradiction to Cole and Wessel’s (2008) findings where the students in their study preferred instructors who have strong ties to the APTA. As illustrated in Figure 1, CIs need further education on the availability of resources; evolving curriculums; student supervision; and how to deal with student behavior issues. Due to their location away from the university, there are inherent difficulties in reaching out to them. The lack of research defining best practices in CI education so that the students can have successful clinical experiences widens the gap. In order for the CI and the DPT student to be successful, a bridge over this clinical education gap is clearly essential.

**Purpose of the Study**

In order to discuss the purpose of this research it is important to begin with how this topic came about. The genesis of this line of research came from a vision to establish a clinical
Figure 1.1. *The Growing Gap in PT Clinical Education*

*Figure 1.1.* Reveals how the gap continues to widen with the unresolved issues on the left wall and the preferred practice patterns on the right.

An education website that would serve volunteer, clinical faculty. The website is now operational and has the primary goal of providing access to quality educational resources similar to the on-campus counterparts and enabling clinical faculty to have meaningful, learning experiences. Educational resources that are on the website include links to the DPT curriculum, Medicare updates that relate to student work in the clinic, as well as student supervisory information. With respect to the learning experience, the illustrated gap walls in Figure 1.1 share the multiple barriers and demonstrate why web-based communication and education is an important focus. This investigation’s purpose enables the characteristics of this new resource to come to be applied to the task of closing the gaps in this field and to uncover what specific features will need to be researched so that the website reaches its full value. The site houses one beta, learning module. Upon completion of this project, the module will have the capability to deliver training and education designed to enhance a CIs’ ability to lay the groundwork for successful rotations and to handle common issues that often arise when working with students. The development of
future modules will occur but how the information presents is unclear without evidence to support the best practices of the instructional delivery. In addition, the development of a methodology that will facilitate the CI's ability to integrate these learned best practices into everyday clinical work completes the picture of the purpose for this study.

With the purpose outlined, next are the research questions (RQs), and the correlating hypotheses (HYPs) and themes (THMs) for this study. The proposed questions, hypotheses, and themes explore one way to provide evidence to support this type of venue and instructional design for best practices in CI education.

- **RQ 1** - To what extent and in what ways do CIs perceive the usefulness of the online module in improving the quality of mentoring of DPT students in the clinic?
  - *Quantitative HYP 1* - CIs will have higher ratings of effectiveness on the delayed post-test, testing for the appropriate skills to work with DPT students in the clinic, than in the pre-test.
  - *Qualitative THM 1* – The themes within the data will show that the CIs will perceive the online learning module to be useful in improving the quality of mentoring of DPT students in the clinic. This will be evidenced by the continued use of the strategies taught within the module. These themes will provide further support that the CIs have indeed learned from the module and are more capable of working with challenging students than prior to taking the module.

- **RQ 2** - To what extent and in what ways do DPT students assess the effectiveness of the performance of the CIs who complete the online module?
- *Quantitative HYP 2*- DPT students will give higher ratings to CIs in the treatment group than the CIs in the control group on a survey instrument that asks specific information in order to reveal best practices taught in the online learning module.

- *Qualitative THM2*- The themes within the student confidential form data will show that the DPT students will perceive an enhanced level of CI effectiveness for the CIs in the treatment group. These themes will show that the module-taught best practices would be observed and experienced by the students. This would be reflected in the data resulting in professional growth and a preferred learning environment for the DPT student.

- **RQ 3**- To what extent and in what ways do CIs maintain module-taught, best practices after a nine-week inactive period?

- *Quantitative HYP 3*- After a nine-week inactive period, CIs from the treatment group will utilize the best practices from the online module as a key resource in order to answer questions to a follow-up case that assesses their ability to work with a challenging student.

- *Qualitative THMs 3*- The themes within the data will demonstrate that the CIs will maintain module-taught, best practices after a 9-week inactive period. This will be seen with the continued use of best practice strategies with how CIs choose to deal with a challenging student in a hypothetical case. These themes will serve to reinforce that the CIs indeed used module-taught best practices as a key resource in order to answer the questions from the case.

In the coming chapters, a deeper explanation of the foundation for this dissertation research takes place. This includes a discussion of the conceptual framework and literature
review that leads into an in-depth look at the research methodology. After describing the methodology of the research, the findings, discussion, and conclusion with future research direction completes this body of work.
Chapter 2 Conceptual Framework

The conceptual framework for this research study focuses on four significant components. Each of these framework components supports the lens used to view and design the dissertation study. These include constructivism, Problem-Based Learning (PBL), Self-Regulation Theory (SRT), Self-Regulated Learning (SRL), and Adult Learning Theory (ALT). Together, these concepts form the backbone to this body of work.

Constructivism and Problem-Based Learning (PBL)

To begin, theoretical frameworks are infrequently cited in the physical therapy literature but when they are, constructivism tends to come up more consistently than others do. This is most likely due to its ability to facilitate learning in both the clinic and distance learning settings. Thus, constructivism provides the basis for the learning environment of this study. To explain further, constructivism is an umbrella term that identifies knowledge as constructed when the learner develops a personal understanding of their own interaction with their environment (Cheaney & Ingebritsen, 2005). Well-known constructivists, Vygotsky, Bruner, Dewey and Jonassen, affirm constructed knowledge should have a strong association with the utilization of groups to promote learning (Huang, 2002). In the field of physical therapy, one pathway in which knowledge production in the clinic frequently occurs is when therapists collaborate to resolve patient issues. This is also true with networking between students and clinical instructors. Since this type of collegial activity occurs regularly, providing a learning environment that follows this behavior pattern in the instructional design of the study was logical.

Keeping in mind how clinic work of physical therapists relates to constructivism, evidence also exists to support how constructivism enhances distance education. Due to the evolving role of online education in the field of physical therapy, it is important to provide
evidence of how constructivism can intermingle and enhance distance education. Huang (2002) did research in this specific area and suggested constructivist approaches could also apply to distance education and educational technology. In his study, he discussed how constructivism can bridge the gap between the learner and the instructor to yield excellent learning outcomes. Since constructivism focuses on the learner’s ability to resolve authentic issues, this theory provides the framework for building knowledge through the process of discovery. Distance learning does provide a challenge for constructivism where distance learning has the potential to isolate the learner. However, the instructor can intentionally design the course to negate this most commonly cited concern. By creating a networking environment of live chats, wikis, asynchronous discussions, self-reflective journaling, the building of peer interaction, feedback, and collaborative projects brings constructivism into the online learning environment. These factors can together create the higher quality learning experience with higher order thinking skills to yield the construction of a meaningful and authentic knowledge opportunity. Francis (2006) acknowledged that learners are heavily influenced by peers, instructors, and society. Thus, the learner needs to find meaning in the online activities that have the ability to apply to life experiences. Lastly, Kala, Isaramalai, and Pohthong (2010) stated that as we move from teacher-centered to student-centered learning environments, constructivism is edging towards center stage.

With that said, the best form in which constructivism takes on the stage is a source of controversy, Robson (2009) performed research in this area and took a different viewpoint for what was considered learner interaction. This researcher argued that group interface, as a fundamental principle of constructivism, is open for interpretation. She went on to state that interaction between an individual and a computer can replace interaction with peers as a form of
constructivism. This is a tremendous challenge to this theory as well as its instructional approaches. For example, the basic tenet of PBL, an instructional approach of constructivism, relies upon group interaction to work through cases and claims that knowledge develops through these processes (Cheaney & Ingebritsen, 2005). Essentially, PBL uses authentic situations to problem solve an issue so that learning can take place. According to Cheaney and Ingebritsen, it activates a student’s prior knowledge as seen by the student’s ability to develop critical-thinking skills that promote self-directed learning. The accomplishment of this level of thinking and learning usually occurs through group discussion which leads to active scaffolding into a real-world problem that yields higher order learning. Anderson and Tredway (2009) continued this path of investigation and found that as students immerse themselves into a case, they tend to transition into the role of stakeholder that enables the learner both control of and responsibility for the learning process. This is exactly the path that DPT students need to take in order to be successful in the clinic. Likewise, through utilization of PBL in the clinic, CIs become more like facilitators that promote not only learning but also reflection and application of new knowledge. Therefore, the evidence points toward PBL’s use of authentic application and construction of knowledge to empower the learner to take control of their learning. Thus, this increases their motivation and development of enhanced thinking skills.

This then takes us back to the supposition that a computer can replace learner interaction and still be considered a constructivist approach. This line of thinking now seems moderately erroneous. However, this thought process warrants deeper investigation due to the fact that, while it was once believed that certain instructional methods and outcomes could not be achieved in the distance learning environment, strong student outcomes are now being attained in the online setting (Regan & Youn, 2008). Consequently, as we get further into the explanation of
this paper’s framework, it becomes evident how each of these components plays a critical role in the development of the research in this focused area.

**Self-Regulation Theory (SRT) and Self Regulated Learning (SRL)**

SRT and SRL also have a heavy influence on the conceptual framework for this dissertation. The first being SRT, this theory has strong principles and similar attributes to constructivism. SRT focuses on the learner's ability to self-direct their learning. Shen, Lee, and Tsai (2008) stated that three characteristics of this theory involve the student’s level of motivation, cognitive processing, and thinking strategies. As PBL is an instructional approach for constructivism, SRL is an instructional approach of SRT. Similarities exist between these two approaches as seen when comparing the different aspects that center on learner-empowerment throughout the learning experience. Additionally these researchers found that PBL encourages self-directed learning evidenced by students having choices in how to answer case questions, control over the direction the case takes, and outcomes of the project. Research suggests that high self-regulation and solid performance in computer-based instruction support use of this approach as a constructivist, instructional model. Tsai and Shen (2009) studied successful distance learning, student strategies. They discovered these students frequently used SRL strategies. Therefore, PBL and SRL instructional methods possess a strong relationship through sharing the characteristics of authentic cases, motivated students, and distance learning.

**Adult Learning Theory (ALT)**

ALT is the third theory that has a significant presence in the conceptual framework. ALT’s characteristics involve self-directed learning, lifelong and experiential learning, learner motivation, readiness to learn, social and critical thinking skills and high autonomy (Knowles, 1990). ALT differentiates itself as a theory based upon the premise of addressing adults as
unique learning entities when compared with children. Many theories that apply to education, utilize children as the ideal population for the basis for their philosophy. Knowles (1990) claims that adult learners bring a set of expectations, goals, and experiences that are distinct from the younger learner. These aspects become significant when looking at online environments. Due to what the adult learner brings to the table, they will not appreciate a learning experience that does not use authentic conditions or have the capability to be self-directed. This especially applies to the field of physical therapy where PTs are passionate about solving patient-centered (authentic) problems.

**Combining PBL, SRL, and ALT**

To show how constructivism lends itself to healthcare, Peters (2000) emphasized that utilizing the constructivist framework in education of nursing professionals, aids in the transition from inexperienced to experienced practitioners. As mentioned earlier, PBL and SRL working together may produce elevated levels of outcomes. Shen, Lee, and Tsai (2008) considered this perspective and performed an exploratory study using PBL and SRL as they relate to online authentic cases. These researchers sought to improve motivation and practice skills by using PBL and SRL, thus they conducted a series of quasi-experiments to assess the instructional designs they developed in a web-based environment. Their findings suggested that there was indeed a link between authentic PBL and SRL cases and enhanced student learning outcomes (Shen, Lee, & Tsai, 2008). As a result, these studies indicate that the principles of ALT have overlap and alignment with the principles of PBL and SRL with the center being constructivism. This is illustrated in Figure 2.1. Additionally, the outlined theories share common features with constructivism that can be described as interactive, collaborative, authentic, and learner-centered (Huang, 2002). With this in mind, there is direct application to DPT students who are expected to
Figure 2.1. *Intersection of theory and approaches*

Figure 2.1. Illustrates how PBL, SRL, and ALT have constructivism as a common foundation.

be adult learners who network with each other and other therapists to unravel the mysteries that patient cases often bring. Thus, through collaboration, networking, and authentic situations, these learning characteristics support the underlying conceptual framework that may eventually facilitate best practices in CI education.
Chapter 3 Literature Review

In this chapter, a thorough literature review provides the foundation for this dissertation research. Terms and definitions start the reader down the path of understanding where the gaps in the research lie in the field of physical therapy clinical education. From there the pool of articles are condensed into a presentation of methods, findings, and how the results from the current research studies will aid in filling in the gaps that currently exist.

Terms and Definitions

In order to establish an underlying knowledge of clinical education, online learning, and research design, a review of accepted terms and definitions as they apply to the field of physical therapy will follow. Erroneous use of words as synonyms, especially with online learning, occurs frequently (Williams, Nicholas, & Gunter, 2005). With this in mind, clarification will provide an understanding of the term’s intention as it relates to this study.

Clinical education is defined as a student’s supplemental clinical work in addition to their didactic experience. In PT programs across the country, a student is required to spend anywhere from seven to forty-eight weeks in a clinical setting (Harris, 2010). In clinical experiences, the students are under the mentorship of CIs and are expected to progress across the learning continuum from novice to demonstrating entry level knowledge and skills.

CIs do not receive any monetary reimbursement for mentoring students in the clinic; however, they do receive faculty development opportunities. These continuing education courses have become more valued as the profession has transitioned to the entry-level degree of Doctor of Physical Therapy and more states are requiring clinical competencies for continued licensure (Gill, 2007). When the term, faculty development, appears it will refer to the CIs’ faculty development through web-based tools.
The next term to address is evidence-based practice (EBP). EBP involves using research to guide clinical decision making along with the values of the patient, clinical experience, and healthcare policies (APTA, 2000). This approach to providing physical therapy care to patients enables the PT practitioner to remain current in the field, provide insurance companies and other healthcare professionals reasoning on why certain treatment regimens are chosen, and to develop consistency in the delivery of care (APTA, 2000).

When considering the combination of clinical education, CIs, and EBP, appropriate interventions are needed to look at the aggregate picture. Design-based research provides an approach that allows for the development of an effective tool to facilitate learning. Within this approach to research lie several commonly accepted characteristics including uncovering relationships between theory, designed artifact, and clinical practice, fostering learning through creation of usable knowledge, and advancing the theories of teaching and learning. Design-based research requires that one of the outcomes of the research to be the description of the process as an important piece of the findings (Baumgartner et al., 2002). By following these steps, a researcher has the ability to increase the potential for educational innovation.

With innovation comes the appropriate choice of venue, which for our purposes is web-based learning. Thus, it is important to insure a consistent understanding of distance education terms; Tallent-Runnels et al. (2006) describe online learning as a course or class that has the only delivery method of instruction being through the Internet. Moreover, online learning can be broken down into two components, asynchronous and synchronous. Regan and Youn (2008) explain asynchronous learning as when the students and/or instructors interact online but not concurrently whereas, synchronous learning occurs when more than one student or instructor is
online interacting and learning at the same time. To provide clarity, studies that address these two types of learning environments will have these delineations.

*Mental* and *distributed practice* are two methods that can be used to reinforce web-based learning. *Mental practice* is the practice strategy employed as someone envisions a task to be done within his or her mind without physically acting on it (O’Sullivan & Schmitz, 2007). Research supports that this form of practice can be of benefit. The level to which it benefits someone is dependent upon the task they are trying to improve (Schmidt & Wrisberg, 2008). Mental practice in combination with physical practice has been shown to be the most effective in reproducing a task than either mental or physical practice alone (Shumway-Cook & Woollacott, 2012). Keeping this in mind, when there is a balance between practice and rest, better results can occur. This is what occurs in *distributed practice*. With this type of practice, there is alternating amounts of rest breaks with activity.

**Assumptions**

There were several assumptions associated with the features of the online module. Evidence indicates that CIs prefer not to deal with issues that occur in the affective domain. Education in this area is key to the success of the student's professional development (Hayes, et al., 1999). Objective issues related to knowledge or techniques occur more frequently and are easier to address; whereas, subjective issues related to professional behavior have a lower occurrence rate but require a greater amount of the CI’s time (Hayes, et al., 1999). Thus, the module focused primarily on how to resolve affective domain issues. Another assumption originated from the focus on the use of *social constructivism theory* that served as the basis for the proposed learning module. Social constructivism's doctrine concentrates on the idea of active knowledge construction by the learner, which relies on experience with and previous knowledge
of the physical and social worlds (Woo & Reeves, 2007). In addition, as a part of social constructivism, the Zone of Proximal Development (ZPD) as described by Vygotsky, is where learning occurs through guidance provided by communication with peers and experts in a context related to real life tasks (Huang, 2002). This zone falls between what learners can do for themselves versus what they cannot do at all. Guided learning with peer and expert interaction promotes construction of knowledge. With this in mind, the intentional instructional design of the learning experience for this study had two components that contributed to the ZPD. The first component was within the learning module as seen by a series of authentic vignettes that created content to help the learner work with challenging students. The cases where real life issues that have happened in clinical settings many times before. The second component was in the wikis, which promoted learner interaction with peers who ranged from novice to seasoned therapists. This ZPD allowed for construction of knowledge to occur not only with an interactive, multimedia learning environment but also among peer networking. In Woo and Reeves’ study (2007), social constructivism emphasized the role of skilled peers, authenticity of tasks, problem solving, collaboration, and reflection in the learning process. These principles and applications provided a strong basis in building the module; based on the assumption was that this was the best theory to use for this designed-based research study.

This led to the two most significant assumptions. The first significant assumption was that a web-based, learning module was the best delivery mode of instruction so that CIs would have access to faculty development activities that would assist them to become better instructors for students. The second significant assumption was that the practice strategies taught in the module were indeed the best practices needed for enhanced CI and student outcomes. In order to comply with Vision 2020, educational resources should integrate EBP to guide clinical education
practices. These assumptions allowed for this line of research to go forward in order to seek out evidence that the practices taught in the module where indeed best practices.

Selection, Exclusion, and Compilation of Studies

**Article selection.** The search for articles started with the use of historical literature that provided significant input to the field of physical therapy clinical education. These include works by May, Morgan, Lemke, Karst, and Stone (1995); Hayes, et al. (1999); and Strohschien, Hagler, and May (2002). By reviewing these articles from the viewpoint of clinical faculty development, keywords were able to be identified that enabled an effective search for current articles. A PubMed search covering the years 2002 to 2012 using the keywords, “physical therapy, clinical education, and student behavior,” yielded 26 articles. The keywords, “clinical instructor and online assessment” using quick search, nursing and allied health, and education as filters in One Search, led to the identification of six articles of significance. This prompted a broader search using keyword terms “student behavior and physical therapy” which netted 414 articles that led to an additional three directly related to physical therapy. “Web-based learning and faculty development” using the same resources as before in One Search resulted in 309 articles. However, using the clustered results of “teaching” and “online learning” helped provide multiple articles. Finally, “online assessment and teaching” keywords were utilized. This provided 763 articles. The search was then narrowed down by adding, “faculty development and distance learning” which replaced “online learning” to the keyword list. Using the clustered results under “distance,” another valuable set of articles surfaced.

This search brought a stable underpinning of articles that were healthcare related; however, it became apparent that another in-depth search for the PBL aspect of the review was necessary. This process of article selection began with deciding upon the keywords to use for the
initial search. Since there have been an enormous number of PBL articles published, the challenge was to narrow the articles down to what was applicable to this topic. The number of articles gradually diminished by adding keywords to the individual search engines that narrowed the broad field to the specific topic area. The first search engine used was OneSearch with the keywords, “problem-based learning” and “web.” The years covered were 1985 to present. This netted 305 articles. Noting that OneSearch was not producing the number of articles it had in previous searches, I chose to use an additional search engine, Summon. Summon was able to generate a great deal more articles. Utilizing Summon with the same keywords yielded 889 articles. From there the additional terms, “modules” and “healthcare” produced eight related articles in OneSearch and twenty-nine articles from Summon but none were related to the topic at hand. A change of keywords to “PBL, modules, online and physical therapy” generated 367 articles. This was narrowed down by adding “faculty development” which decreased the number of results to 19 but none were relevant to add to this literature search. Lastly, Summon was used for a key word search of “faculty development online learning physical therapy modules clinical education.” This netted 384 articles which produced an insightful meta-analysis article. PubMed was the next search engine used with the same key words. This generated seventeen additional studies. With EbscoHost Image Quick View, several times the initial search did not find any results; however, the SmartText function guided me towards multiple articles. After SmartText located hundreds of articles, additional keywords narrowed down the articles from 243 to 19 articles. The Social Sciences Citation Index using subject areas of educational research, nursing, medicine, rehabilitation, and healthcare produced 80 articles. In this search engine, an additional search using “faculty development online” resulted in 64 articles. One article from this search contributed to the literature review. Adding ERIC and Education full text with “online learning
module” successfully generated four relevant articles out of 315. When adding the keywords “faculty development” two articles were identified but neither was appropriate. I also added “physical therapy” to “online learning module” where one article came up but was not applicable either. The last search engine used was PsychInfo. This database retrieved 41 articles by using the keywords, “online” and “PBL.” When adding the keyword “healthcare,” the search engine found three articles but none were applicable to this study. The last search included keywords, “best practices, memory consolidation, and mental practice”. This search netted five articles that strongly support the design of the methodology for this project.

The final step in the search for studies involved looking through the reference list in the most recent published articles and performing a crosscheck for additional studies that would be of assistance in identifying gaps in the field. By following these procedures, a strong collection of studies serve as a platform to identify potential gaps in the field of physical therapy clinical education.

**Exclusion criteria.** Keeping in mind the number of articles found, employing stringent exclusion criteria was a necessity to create a more appropriate pool of studies. There are an enormous number of articles published in the field of online learning and distance education. The challenge was to taper the volume of articles to what was applicable to this topic. Omitted studies were not empirical, had blended environments, related to a K-12 age group, published prior to 1985, and did not have PBL as an instructional approach or an online treatment. Additional exclusion of articles occurred if they were not in one of the two primary fields of education or healthcare; did not relate to asynchronous online learning and assessment, physical therapy clinical education and student behavior, or faculty development. Thus, by following this procedure, it effectively produced a pool of articles that supported this dissertation research.
Compiling information. A total of 44 articles were compiled. After taking time to assimilate the topics of the papers, the articles tended to fall into five separate categories, which were clinical education, online learning, online assessment, knowledge transfer, and distance education and physical therapy. The final category functions as a connection or bridge if you will, between distance learning and physical therapy.

Methods

Within this section is a review of the methods utilized in the compiled pool of studies. Through exploration of these articles, certain common themes emerged. An in-depth look at these consistent themes follows which comprises of theoretical frameworks, study design, data collection tools, validity, and reliability.

Theoretical frameworks. Throughout the examination of these articles, the provision of a theoretical framework was inconsistent. Only twelve studies offered an assessment of their philosophical viewpoint. Shen, Lee, and Tsai (2008) and Kay and Knaack (2009) utilized the Cognitive Educational Theory as a basis for their research. These authors explained that this particular theory encourages the development of problem-solving and judgment-making skills. However, it was in the minority as six studies used constructivism as their theoretical framework (Cheaney & Ingebritsen, 2005; Dempsey, 2001; Hull & Saxon, 2009; McLinden, McCall, Hinton, & Weston, 2007; Robson, 2009; Sendag & Odabasi, 2009). Four additional studies relied on Self Regulated Learning Theory and Adult Learning Theory as the frameworks for their studies (Foord-May & May, 2007; Jedlicka, Brown, Bunch, & Jaffe, 2002; Shen, Lee, & Tsai, 2008; Tsai & Shen, 2009). Constructivism was the most widely used framework and its characteristics made it the most appropriate choice as the conceptual framework for this dissertation study.
Study Design. The pool of articles had either quantitative, qualitative, or action research approaches. Thirty-one of the studies were either entirely quantitative or part quantitative in approach. Only one study had an action research approach, which examined student experiences using a website developed solely to support learning and acted as a bridge between the university and practice (Quinney, 2005). A handful of the studies purposefully utilized qualitative approaches to illustrate a grounded theory or emergent design technique to achieve a clearer understanding of what was actually occurring in the clinical setting (Davis, 2008; Foord-May & May, 2006; Sandars, Langlois, & Waterman, 2007; Santasier & Plack, 2007; Savin-Baden & Major, 2007; Sellheim, 2006; Wolff-Burke, 2005). The mixed methods studies frequently used the formats of survey/questionnaire and pre/post testing. The use of quantitative designs made it evident to what the measurable outcomes were. Comparison between the results of the experiment and the norms would occur followed by an assessment of statistical significance. Use of a qualitative design (McMillan, 2000) allowed the assessment of a deeper understanding of knowledge construction of how CI and student perspectives influence each other. This occurred by the qualitative findings further validating the quantitative findings.

Another step toward a better understanding of how this study unfolded occurred by taking pieces of information from the types of study designs the pool of articles represented. The quantitative approach provided objective data whereas the qualitative approach illustrated the affective nuances that may have remained unseen in the numbers. Therefore, by using a mixed methods approach, the dissertation research provided a more accurate and complete picture of the clinical environment. The challenge of this project was that the utilization of mixed methods in this context went beyond the combinations described in the literature. This required the development of a unique solution. Creating a research design that incorporated both a
quantitative, pre/post testing approach with a qualitative, focus group/questionnaire yielded
results that were appropriate to this setting and more reflective of what was actually happening in
clinical education.

Data Collection Tools. In regards to data collection tools, the emergent theme focused
on deriving participants’ perceptions. Sixteen of the studies used a type of questionnaire that
focused on perceptions of participants (Arend, 2006; Cheaney & Ingebritsen, 2005; Cole &
Wessel, 2008; Freeman, Holcomb, Brickell, Chandler, & Muellenberg, 2004; Gill, 2007;
Gurpinar, Zayim, Ozenci, & Alimoglu, 2009; Hadley, Davis, & Khan, 2007; Housel, Gandy, &
Edmondson, 2010; Jedlicka, et al., 2002; Kay & Knaack, 2009; McLinden, et al., 2007; Poulton,
Round, & Hilton, 2009; Recker-Hughes, et al., 2010; Robson, 2009; Tsai & Shen, 2009;
Weidner & Henning, 2005). Three focus groups occurred. Two took place in the qualitative
studies (Davis, 2008; Foord-May, 2006) and the other in the action research study (Quinney,
2005). Another type of data collection tool employed was interviewing. Although nine sets of
interviews took place, only five assumed the formal qualitative steps to report the findings
(Foord-May, 2006; Gill, 2007; Robson, 2009; Sellheim, 2009; Wolff-Burke, 2005). Finally, pre
and/or posttests prompted assessment of learning outcomes (Cheaney & Ingebritsen, 2005;
Dennis, 2003; Gurpinar, 2009; Robson, 2009; Sendag & Odabasi, 2009; Shen, Lee, & Tsai,
2008; Tsai & Shen, 2009). Thus, a majority of the studies utilized perceptions as their primary
treatments with questionnaires and surveys as their data collection instruments with a minor
focus on measuring the actual impact of a particular treatment on a learning outcome. Cited
models included the Kolb Experiential Learning Model (Sellheim, 2006), Systematic
Instructional Design Model (Freeman, et al., 2004), and Brookfield’s Critical Incident
Questionnaire (Cole & Wessel, 2008). Each model provided an opportunity for facilitating the
data collection results and improved understanding of student or instructor behavior. Thus, these uncovered themes suggested that foundational research is in place, but the next level of research needs to focus on expanding the current field. The expansion of the field could occur through more mixed methods research to help capture more from the student and CI perspective. In addition to this, a focus on evaluating student outcomes would also promote further growth of the research knowledge base in clinical physical therapy education.

**Reliability and Validity.** Of the articles reviewed, only three reported reliability testing (Housel & Gandy, 2008; Kay & Knaack, 2009; Santasier & Plack, 2007). Housel and Gandy (2008) focused on the interrater reliability of the Clinical Performance Instrument (CPI), which is the most widely accepted grading instrument of clinical education in the field of physical therapy. They stated that the CPI had a reliability rating of .87 using Intraclass Correlations Coefficients (ICC). Kay and Knaack (2009) assessed internal reliability by utilizing Cronbach’s alpha to prove that the attained values were acceptable. Santasier and Plack (2007) discussed the interrater reliability for the coding scheme used in their study, which used a Kappa statistic to demonstrate satisfactory rates.

Five studies reported validity (Housel & Gandy, 2008; Housel, Gandy, & Edmondson, 2010; Kay & Knaack, 2009; Robson, 2009; Tsai & Shen, 2009). Housel and Gandy (2008) reviewed the process of confirming the construct validity of the CPI. Housel, Gandy, and Edmondson (2010) stated that their primary data collection tool, the Physical Therapy Student Evaluation of Clinical Education Experience (PTSE), has gone through extensive validity testing, specifically content and face validity, but did not provide details of how this testing occurred. The PTSE’s validity is a controversial topic in physical therapy clinical education where it was questioned by a group of researchers due to a study published in 2005 (Afonso,
Cardozo, Macarenhas, Aranha, & Chirag, 2005). Specifically, the issue of validity centered on whether shared feedback evaluation forms or confidential feedback forms were more valid. This is a topic of ongoing research.

More articles in the pool focused on different types of validity. Kay and Knaack (2009) utilized a principal component analysis to review construct validity and also provided an in-depth discussion on the convergent, predictive, and face validities of their study. Robson (2009) reported validity by stating each learning module had a review performed by an educationalist, nurse educationalist, and non-educationalist. Each of these experts provided feedback on facts, coverage of the topic, educational aspects, web design, predicted acceptability, and appropriateness for the target audience. Tsai and Shen (2009) discussed experimental validity as an issue due to the potential for exposure of the students in the comparison group to the treatment condition where the students may have had instructors that displayed more enthusiasm and higher motivation toward teaching. Thus, the potential existed for the protocol to be violated and resulting in skewed results.

Although the reliability and validity testing in this collection of articles was extremely limited, within the cited studies, there was exploration of these factors at a significant depth. Putting that point aside, one fact remained which brought a serious issue to light. It demanded that an incorporation of further validity and reliability testing of studies in this niche of the physical therapy field take place.

Findings

As stated previously, the relevant, empirical studies fell into one of five categories. An in-depth look at each of these categories begins with the historical articles that offer key concepts that provide the foundation for this research. As stated earlier, Hayes, Huber, Rogers, and
Sanders (1999) found that CIs preferred not to provide subjective feedback to students. May, et al. (1995) proposed a model for ability-based assessment which was the foundational study for the generic abilities. Generic abilities, now Professional Behaviors, are currently in practice throughout physical therapy clinical education across the United States. Lastly, Strohschein, et al. (2002) outlined the gradual role reversal of student and CI as the student progresses across the learning continuum from novice to entry-level therapist. Note that these articles focus primarily on student behaviors, learning models, and CI/student roles. Each of these landmark studies opened the door for a plethora of research questions on designing learning opportunities to enhance student outcomes and CI skill sets.

**CI development.** With the groundwork established, a closer look at the findings in clinical education was in order to identify gaps in the literature. Specifically, findings in the area of clinical education as it related to professionalism indicated that student behaviors respond not only to the use of professional behaviors but also to enhanced teaching strategies (Davis, 2008; Papadakis, Hodgson, Teherani, & Kohatsu, 2004). Looking deeper into teaching strategies, four research teams focused their efforts in discovering improved instructional techniques to enhance student outcomes in the clinic (Foord-May & May, 2007; Morren, Gordon, & Sawyer 2008; Santasier & Plack, 2007; Sellheim, 2006; Wolff-Burke, 2005). One mode of enhancing instructional techniques takes place through the CI Clinical Education Credentialing Course offered by the APTA. This course is a two-day workshop broken down into six modules, which concludes with an assessment center. The credentialing course uses several case-based scenarios to facilitate learning and enhance outcomes. Morren, Gordon, and Sawyer (2008) noted CI credentialing does contribute to a few improved clinical instruction skills. However, the study also showed that a credentialed CI draws on more than just their certification skills when
working with students in the clinic. Sellheim (2006) chose to take a step back to look at the bigger picture and did extensive work studying the influence of instructor beliefs on teaching, learning, and methodologies. She found that the educational beliefs PT instructors possessed had a direct influence in what teaching methodologies they incorporated (Sellheim, 2006). Lastly, Foord-May and May (2007) considered the question of an instructor's ability to facilitate an effective change in adult learners. The results of these studies indicated that a CI could enhance the learning environment of a DPT student if given the tools to do so, was sufficiently trained and motivated to use them. By gathering all of these teams’ work, their findings provided preliminary information on how instructors could effect change in improving student outcomes.

Recker-Hughes, Brooks, Mowder-Tinney, and Pivko (2010) took a different vantage point of faculty development through the CI perspective. These researchers performed survey research and discovered that out of 497 CI respondents greater than 70% believed that the web-based instruction currently offered as professional development was inadequate. They went on to find that 75% of CIs had a moderate to high interest in faculty development occurring via web-based instruction (Recker-Hughes, et al., 2010). Thus, the perception of the respondents was that web-based instruction was a promising and attractive professional development tool but the number of quality offerings was in short supply.

Adding to the paradox of the state of online learning professional development courses, McColgan and Rice (2012) stated that healthcare workers often feel a contradiction in the workplace where they are required to stay current with the advances in their field but the necessary training to do so occur outside work hours. To follow through with this line of thought, Robson (2009) identified an additional implication for online faculty development. In a study with physicians, she found that healthcare workers were willing to accomplish clinical
competencies in an asynchronous setting. Additionally, Regan and Youn (2008) stated that the practicality of this approach to learning is immense considering that many healthcare professionals seeking professional development courses in the online environment do so in order to remove the requirement of having to “meet” online at a specific time (Regan & Youn, 2008). Clinical competencies, as mentioned earlier, are important not only to maintain licensure but also to promote continuous professional growth and insure the best possible delivery of patient care, both of which are strong motivators for professionals to take advantage of convenient, high quality opportunities.

**CI performance.** Taking into consideration the perceived lack of CI faculty development opportunities, a weakened foundation of clinical education led to the identification of an even less-traveled path of CI performance assessment. Housel, Gandy, and Edmondson (2010) looked through the eyes of students’ as means to ascertain the perceptions of how CI instruction improved after attending a CI credentialing course offered through the APTA. The researchers concluded that students scored credentialed CIs similarly to the non-credentialed CIs on the Physical Therapy Student Evaluation form (PTSE). The PTSE is a form used throughout PT clinical education in the United States that enables the PT student to assess the clinical site and the CI’s performance. It takes a snapshot of the CI’s performance from the student’s viewpoint. What was of interest is only two out of twenty-seven criteria that measured the difference between the PTSE scores of the credentialed versus non-credentialed CIs were statistically significant. This suggested that the students' did not perceive their credentialed CIs to be more effective on an indicator-by-indicator basis. However, after adding all of the criteria together, the credentialed CIs’ rankings proved to be statistically significant. Thus, the big picture implies that overall; the students did feel the credentialed CIs were more effective. Nevertheless, it is
important to note that the studies looked at students’ perceptions but not at the CIs self-perceived effectiveness in clinical instruction after training. Nor did this study consider the fact that the PTSE is a shared evaluation and not a confidential feedback form.

Housel and Gandy (2008) explored the PT CPI ratings of students who had credentialed CIs versus non-credentialed CIs. The comparisons of these ratings at midterm and final per student did not reveal a statistical difference. This led the researchers to perform a post hoc analysis. They found a statistically significant difference in the ratings of students who received mentoring by credentialed CIs by comparing all indicators together versus individually as done in the initial data analysis. Students mentored by a credentialed CI had a greater amount of positive change from midterm to final evaluations when compared to their counterparts mentored by non-credentialed CIs. This groundbreaking study shared quantifiable findings in regards to CI development training and CI performance as it affected student outcomes.

To summarize CI development and performance, the link between CI training and perceived student outcomes is sparse. To make matters even more complicated, CIs feel that the quantity and quality of web-based faculty development opportunities are scarce. In addition, only one study explored the potential of student success because of improved CI effectiveness in the clinic after CI training. Finally, no studies looked at how CIs perceived a potential change in their ability to provide clinical instruction to students after they have participated in faculty development training. Thus, this gap demonstrates extremely limited research in an area that is critical to the success of our students and ongoing success of our profession.

**Online learning.** Although the amount of scholarly articles that address online learning is growing quickly, very few of these articles deal with healthcare-related, faculty development. For the most part, the studies for this literature review focused on the development of healthcare
professionals. Freeman, Holcomb, Brickell, Chandler, and Muellenberg (2004) were one of these research teams that studied online learning as it applies to healthcare professional development. Their specific study led to a greater understanding of how continuing education courses facilitate faculty networking and sustained interest in career development. This is a critical factor in a physical therapist’s career as competency is a continuous push in physical therapy. As an adjunct to continued competency, Hull and Saxon’s research (2008) emphasized the use of constructivism in the online learning environment to elicit positive learning outcomes in professional development. Going further with constructivism, Tsai and Shen (2009) considered that through application of online learning principles that combine both SRL and PBL, could indeed promote better learning outcomes. These studies suggested that a collaborative effort with constructivist approaches in the web-based environment through university-sponsored continuing education opportunities may yield a more positive experience for the clinical faculty member.

Another researcher, Peters (2000), clarified that enhanced knowledge takes into consideration prior knowledge and promotes the student taking ownership of their learning experience. This is consistent with Adult Learning Theory (ALT), which utilizes constructivism as its basic premise. With this in mind, the next subsection discusses how PBL can be expressed in an online learning environment.

**PBL as a learning environment.** PBL as a learning environment as it pertains to online education has attracted the attention of many researchers. Moreover, the use of authentic cases as a preferred format to engage in PBL activities has been a focal point. Dempsey (2001) and McLinden, McCall, Hinton, and Weston (2007) found that the use of authentic conditions in PBL encouraged improved engagement and learning through authentic experiences. Crawford (2011) stated that in a social environment with co-participation of learners, PBL usage in online
learning facilitates a student’s construction of meaning which encourages student autonomy. This is also in agreement with Knowles’ (1990) ALT where the adult learner strives to be motivated through active learning and real life application of problems. Cheaney and Ingebritson (2005) continued this line of investigation by confirming how PBL assists in student learning. These researchers established that PBL activates students’ previous knowledge, restructures that knowledge to fit the problem presented; and encourages learning in a scaffolding context of an authentic, real-world problem.

With an eye toward optimizing online learning, researchers have investigated the use of a PBL approach and its effects on higher critical-thinking skills. Cheaney and Ingebritson (2005) as well as McLinden, et al. (2007) established that higher-order learning and construction of knowledge takes place in the online PBL environment. Specifically, Cheaney and Ingebritson investigated PBL in an online course by examination of the human aspects surrounding the use of DNA testing for genetic diseases. They noted that most of the scores of the students remained the same in the online versus traditional environments; however, they found a significant difference when comparing the group interaction between the two environments. Where the traditional students were able to come up with more spontaneous ideas the online students were able to research information needed to help fulfill their roles prior to posting to their group’s pages. In McLinden, et al.’s study, the researchers were able to facilitate construction of knowledge for their participants in order to enhance understanding and self-reported knowledge as it related to the learning module outcomes. With that said, it is interesting to note that Sendag and Odabasi (2009) did not find that there was an increase in content knowledge acquisition but did have findings similar to the aforementioned researchers where PBL facilitated higher critical thinking skills. These findings helped to support the assertion that online education could provide
a productive learning environment using PBL as an instructional model but did not validate that newly acquired skills translate into practical use in an authentic clinical environment.

**Type of Online Formats.** The use of PBL learning modules presents students with the opportunity to explore case scenarios and work as a team to resolve dilemmas. There are two types of online learning formats that are specific to this area of research, synchronous and asynchronous. An example of synchronous formats would be if an online class would meet in Second Life to have a scavenger hunt. More than one learner and perhaps the instructor would be online at the same time facilitating a joint learning venture. This mode of instruction encourages "in the moment" learning. An asynchronous format example would be the use of a discussion board. This type of learning allows time for reflection and enables insights to develop independent of the variable of time. In seven of eight studies, PBL online learning modules were performed in synchronous environments with grouped participants (Cheaney & Ingebritson, 2005; Dennis, 2008; Gurpinar, Zayim, Ozenci, & Alimoglu, 2009; McLinden, et al., 2007; Poulton, Conradi, Kavia, Round, & Hilton, 2009; Sendag & Odabasi, 2009; Tsai & Shen, 2009). Only one study completed by Robson (2009) had an asynchronous approach. In this study, the researcher chose to replace the characteristic group functions that are associated with PBL with the interaction of a computer. This unique approach is not the traditional tactic of a constructivist methodology. This begs the question of whether this is truly a PBL approach. However, Robson (2009) did find that this path was acceptable to the participants of the study as a form of learning. Essentially, this was the only study that utilized asynchronous, online learning modules but the use of PBL was debatable. According to Perry (2002), investigators have not proven that what learners propose they would do strongly correlates with what they genuinely do in their authentic environment or how a solution to a mock situation translates into the learner's true environment.
Thus, this is an indication for more research to test the use of PBL in asynchronous, group environments.

**Online Assessment.** The discussion surrounding the effectiveness of online learning and faculty development requires the examination of online assessment. Use of multiple assessors so that various viewpoints can be applied to the data is a preferred method of accurate online assessment (Arend, 2006). To illustrate the point, the use of multiple assessors in clinical education frequently occurs when student performance in the clinic is an issue. Obtaining an additional PT’s professional judgment helps to minimize bias and accurately portray the student’s actual, achieved rating. Kay and Knaack (2009) investigated an online assessment tool, the Learning Object Evaluation Scale (LOE-S). This scale spotlighted learning quality, instructional design, and engagement. By proving this tool reliable and valid, this provided a framework in which to establish other tools as both reliable and valid as well. Chang (2002) noted that it is critical for online instructors to possess tools to support the evaluation of student learning that will eliminate biased assessment. She also stated that online assessment could be broken down into three main parts. First, formative assessment transpired through studying a student’s navigation of the course website. By monitoring the student’s navigation behavior, the time spent on individual modules and how the student advanced from unit to unit informed the instructor of desirable or undesirable behavior. The second and third parts related to summative assessment. Chang revealed that instructors needed to not only examine the outcomes of exams and quizzes but also look at the quality/complexity of the problems. This is where the instructor would analyze which level of questions was correct or missed. This too provided an in-depth look at the type of learning the student was able to achieve. Although Chang outlined a path for
distance learning evaluation, she suggested that this niche of research in distance education was just beginning to evolve.

Wijekumar, Ferguson, and Wagoner (2006) also studied the fallacies of traditional assessment tools but from the vantage point of how it applied to the online environment. They proved that although multiple choice testing is widely used in the online setting, it is not the best vehicle for assessment. These researchers urged online instructors to step away from this type of testing as well as simply counting discussion board posts and look for another, more appropriate form of detecting a student’s understanding of the material. They suggested an analysis of chat room discussions, e-portfolios, group projects, training modules with problem solving logs, and discussion board- dialogue analysis. From online learning to online assessment, these studies confirmed that accurate assessment of learning has several avenues available in the distance education environment yet minimal research exists to support a best practice.

**Knowledge Transfer.** Considering the importance for finding best practices in the online format, necessitated an examination of how knowledge gained from newly discovered evidence transfers into clinical practice. In order to optimize outcomes with knowledge transfer, both motor and cognitive learning should occur. What are not understood are the mechanisms needed in order to accomplish this task. Traditional learning methods suggest the “grill and drill” approach. However, this method has been repeatedly shown to not be successful in producing long term effects. Menon, Korner-Bitensky, Kastner, McKibbon, and Straus (2009) performed a systematic review of strategies for how to move evidence-based knowledge into the clinic. They found substantial proof to support a need for multimodal components in order to achieve the goal of translation of evidence into practice. Unfortunately, the specific modes for successful implementation remain unclear.
In addition to the use of multimodal methods, distributed practice is also important. Thus, support for distributed learning across periods of time is growing due to the mounting evidence. Censor and Sagi (2008) found that short intensive sessions spaced with intentional rest periods yielded enhanced retention of the evidence-based practices. Shea, Lai, Black and Park’s (2000) study looked specifically at the spacing of learning sessions. They found that long intervals over a period of days versus within the same day, enabled learning to convert into long-term memory. With respect to memory consolidation and mental practice, the research supports the notion that the activity is continuous (as in the case of this dissertation study), where the CIs are expected to integrate and apply learned materials in an ongoing fashion, equal periods of activity and rest yielded favorable results (Schmidt & Wrisberg, 2008).

**Connection.** By looking at clinical education, development and knowledge transfer through the viewpoint of enhancing CI education, supported learning promotes a connection between the university and clinical practice that yields better student outcomes (Quinney, 2005). What has been stated up to this point has concentrated on each of the categories somewhat independent of each other. This category provides a look at the relationships that exist with a focus on the clinic and online learning. Table 3.1 illustrates the findings that demonstrate the connection between distance education and CI-related studies as well as its practical application to the academic and clinical settings. Additional findings in the areas of linking CI education and student experiences, faculty development, and instructional methods are included here. Thus, the framework of the proposed clinical faculty resource begins to take shape as themes emerge surrounding adult learner characteristics, web-based modules and continued competency.

Based on the findings in this section, two underlying trends surfaced. The first trend was CI-centered and focused on the need to discover instructional characteristics the CI should
Table 3.1.

*Resource Connection between Distance Education and CI Scholarly Articles*

<table>
<thead>
<tr>
<th>Author/Date</th>
<th>Primary Findings</th>
<th>Research Gaps</th>
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<tbody>
<tr>
<td>Cole and Wessel (2008)</td>
<td>CIs could improve student learning by: Introduce, explain, demonstrate, allow time; provide feedback and recap; hands on work; challenge students/then reflection; respect students/ allow independence; model professional behavior</td>
<td>This study focuses on student learning in the first clinical rotation; CI characteristics that promote student learning has little research support</td>
</tr>
<tr>
<td>Dieker, et al. (2009)</td>
<td>Shares a replicable process for creating web-based video that accurately represents implementation of EBP; video models enhanced learning of both prospective and practicing teachers across three university sites</td>
<td>Pilot study; Need for web-based video models to assist with finding effective instructional practices for use in teacher education settings</td>
</tr>
<tr>
<td>Gill (2007)</td>
<td>Growing concern among healthcare workers regarding continued competency; Established that e-learning can be a preferred method of teaching for professional development</td>
<td>CIs are acutely aware of changing licensing requirements; Need to demonstrate continued competency; minimal research connecting this to CI improved practice</td>
</tr>
<tr>
<td>Guhde (2010)</td>
<td>Instructor-generated videos promoted students critical thinking and enhanced student outcomes. These videos enable the instructor to tailor the learning experience to the different learning styles of the viewer</td>
<td>More research indicated to validate that learning occurs using instructor-generated healthcare-based videos</td>
</tr>
<tr>
<td>Hadley, Davis, and Kahn (2007)</td>
<td>Tailor-made learning experience for target audience; 75% of participants felt that evidence-based Medicine (EBM) was essential to practice, following attendance at the workshop; 100% said web-based modules gave useful skills for clinical practice</td>
<td>Describes the development of educational curriculum, evaluates its success and appraises the methods; Limited availability of evidence-based online, continuing education courses for allied health practitioners</td>
</tr>
<tr>
<td>Jedlicka</td>
<td>No statistically significant differences</td>
<td>Research focuses on insuring</td>
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38
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<tr>
<th>Authors</th>
<th>Summary</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Brown, Bunch, &amp; Jaffe (2002)</td>
<td>in student performance on multiple choice MC exams using the three</td>
<td>effective learning/student</td>
</tr>
<tr>
<td></td>
<td>instructional methods; instructors need to structure assignments that facilitate interaction and communication among learners</td>
<td>engagement; reports lack of study in determining the most effect methods of delivery of online instruction</td>
</tr>
<tr>
<td>Robson (2009)</td>
<td>The participants accept the learning modules as a vehicle for change in their practice as a form of continued competency despite their performance on the post tests</td>
<td>Suggests more research on use of online learning modules should be provided as a means of learning in continuing education courses</td>
</tr>
<tr>
<td>Weidner and Henning (2004)</td>
<td>Develop seven standards for training and evaluation of athletic trainer CIs; As a by-product of the research the Athletic Trainers develop an enhancement of understanding of clinical education</td>
<td>Athletic Trainers utilize seven physical therapy clinical instructor criteria to develop standards for clinical faculty; additional research in area of validating the developed clinical standards</td>
</tr>
<tr>
<td>Weidner and Henning (2005)</td>
<td>The importance of standards and barriers to implementing a standard were the most common themes; Important to be aware of the strain on a clinical instructor as they have a dual role of clinician and clinical instructor</td>
<td>Assess importance and applicability of CI standards to certified Athletic Trainers employed in different clinical education settings; request further investigation of the strain on CIs</td>
</tr>
</tbody>
</table>

Note: EBP= Evidence Based Practice; MC=multiple choice

exhibit to promote the best possible student-learning environment. The proposed resource should possess characteristics consistent with those that have been proven to promote success of the adult learner (Hadley, Davis, & Kahn, 2007). The second trend focused on best practices. What should the most effective instructional design look like? What is the best delivery system? Most importantly, how can the resource be made available to the CIs? These questions point to the fact that healthcare professionals require appropriate resources for faculty development so that instructional training can occur in these specific areas. The form in which this support takes lies within these studies. A resource that encourages sense of community and provides prompt
feedback may facilitate the foundation needed to promote CI and student clinical success (Stanton, 2001). Therefore, these trends support the need for research and development of an innovative educational resource for clinical faculty.

Overall, the findings can be summarized in five preliminary concepts. First, the research maintains that learning modules enhance learning specifically if they are tailor-made to the situation (Dieker, et al. 2009; Gill 2007; Hadley, Davis & Hahn, 2007; Robson, 2009). Second, student behavior improves by using the generic abilities (Professional Behaviors), CI instruction, support, and modeling (Cole & Wessel, 2008; Davis, 2008; Foord-May & May, 2007; Hayes, et al., 1999; Hull & Saxon, 2009; May, et al., 1995; Morren, Gordon, & Sawyer, 2008). Third, faculty development standards are just starting to be established and online modules are undergoing preliminary research trials in the physical therapy clinic (Freeman, et al., 2004; Gill, 2007; Hull & Saxon, 2009; Robson, 2009). Both Dieker, et al. (2009) and Hadley (2007) go a step further to emphasize the use of video-learning modules and evidence to deliver strong faculty development online courses. Lastly, good instructional design practices and the assessment of data from multiple perspectives promote solid measurement standards in web-based assessment (Arend, 2006; Chang, 2002; Kay & Knaack, 2009; Wijekumar, Ferguson, & Wagoner, 2006). With the concepts identified through the exploration of the findings leads to a summary of the research gaps and how the dissertation study begins to fill in those gaps.

Summary

In this literature review, I have described how the article selection process led to either inclusion or exclusion from the pool of studies needed to support the goal of defining gaps in the research and ultimately painted a clear picture of what the research needs are in the field of PT clinical education. The methodology of the studies outlined the theoretical frameworks, study
designs, and data collection tools commonly used. The findings have underscored the importance of the need for more research in the area of clinical faculty development and, in particular, web-based faculty development opportunities.

The collection of studies suggested that through the utilization of PBL, higher order thinking could occur. However, there was a lack of evidence to support the assertion that newly acquired higher level of critical thinking skills could translate into practical use in an authentic, clinical environment. In addition to this, only one study proved enhanced student success as a result of improved CI effectiveness in the clinic after training. Thus, a weak link exists between CI training and perceived student outcomes. The literature does not show conclusively what qualifies as good instruction in an online environment and more importantly what type of support and feedback gives learners the best opportunity for successful learning outcomes. This fact adds to the concern of a lack of a best practice methodology for CIs to utilize when mentoring students. Further best practice issues, must include memory consolidation and mental practice. Even though researchers have found evidence to support distributed practice in order to enhance long-term incorporation of best practices through multimodal instruction, the actual mechanisms that assist with the transfer of knowledge into the clinic remain unknown.

With respect to faculty development opportunities for web-based instruction, clinical competencies, and student perceived effectiveness, studies offered insights into the needs in this area. However, quantity and quality are not meeting the current demand. One study focused on an asynchronous, online module, PBL environment to assess professional development efficacy. In addition, little research exists on how video-learning modeling affects learning outcomes and whether or not it is the most appropriate mode of change for faculty development training.
Besides content gaps, research design gaps also exist where studies that use strong validity and reliability procedures are few. The study designs of a majority of the empirical articles evaluated were at the exploratory level. Additional design issues related to a focus on participant perception instead of assessment of learning outcomes. A handful of studies had a constructivist, theoretical framework with a qualitative approach. There is a clear call for controlled experiments with explicit discussion on validity, reliability, trustworthiness, and dependability. The primary function for the data collection tools used mostly involved obtaining participants’ perceptions with less focus on measuring learning outcomes. To review, these studies did not demonstrate a link between best practices that would facilitate faculty learning in a PBL online environment and an enhanced physical therapy student experience in the clinic. Implementation and successful outcomes generated from this dissertation study will assist in validating this process.

Along with the above-mentioned articles, findings from the pilot study also assisted in further delineation of how to proceed with this dissertation research. It was a necessary first step so that a better understanding of how to create a toolbox for the CIs so that they can proactively or reactively assist a DPT student in need. One of the most significant findings from the pilot study was the development of a draft clinical application model. Upon first glance of Figure 3.1, it is notable that the starting point of the model is the CI. This emphasis requires the model to encircle the CIs’ traits with each step. However, it is important to note the intentional shape of each layer. The model deliberately illustrates a “ballooning” effect where each stage builds upon the previous one. However, multiple factors impede equal distribution; therefore, eliminating the possibility of a balanced ripple design. Evolution of the CI continues to progress toward eventual Future Best Practice, which is the optimal clinical education goal.
Figure 3.1. *CI Best Practices Education Model*

![CI Best Practices Education Model](image)

*Figure 3.1.* This model shows the steps of how CI education can facilitate a change in current practice in order to achieve future best practice.

Beginning with describing *Current CI Practice*, this stage focuses on a priori knowledge. It accounts for what experiences the CI had as a student as well as with previously supervised students. It includes CI attitudes toward online learning, self-efficacy as it relates to technology, and willingness to address any identified knowledge gaps and biases. The second stage denotes *Module Intervention*. This phase includes past experiential background and requires examination of self-imposed barriers by the CI with regards to willingness to learn new clinical education tactics and working through technological issues. The *Altered CI Performance* stage reaches into previous experiences and module intervention to produce better CI outcomes. Lastly, *Future Best Practices* is where the CI incorporates all of the previous phases. In this stage, CIs reflect upon their experiential background, how to implement new knowledge, and provide optimal learning environments for students on a consistent basis. It is this last transition from Altered CI
Performance to Future Best Practices that is the mystery to solve. How do we get our CIs to take this new knowledge and incorporate it long term? This is what the dissertation study strived to uncover. Thus, these statements lead to further reflection of how the dissertation research assists in closing the gaps.

Learning from the pilot study findings and the studies outlined above, helped to determine the research design required for the dissertation. The dissertation study was a controlled experiment that went beyond measuring perceptions through surveys and questionnaires in order to help to expand the field. It possessed both reliability and validity as it related to quantitative methods, and trustworthiness and dependability as it related to qualitative methods to insure the quality and integrity of the experiment, grounded in the instructional methodology of PBL and SRL. The gaps pointed to a need for research that could confirm if online video-learning modules were a preferred vehicle for faculty development that could be capable of producing high quality learning outcomes, which included distributed practice to allow for retaining best practices in clinical education.

By performing this research, enhanced knowledge in this area occurred, as it promoted a better understanding of how to mentor CIs as they are instructing DPT students. With further research, validation of best practices can occur, and then the ultimate win-win scenario would occur. The CIs would be able to prove continued competency within their practice for student education. A sense of satisfaction and confidence could exist, as the CI would know they are doing their best to support the student and the university’s program. In addition, the DPT student has the opportunity to enjoy the benefits of an enhanced clinical environment and potentially have better outcomes from their learning experiences.
Figure 3.2. *The bridge over the gap*

Figure 3.2. Reveals how the bridge can facilitate closure of the gap by creating an online clinical faculty resource.

Therefore, it is important to discover the link between clinical faculty development and CI best practices so that the bridge over the gap could come to fruition as seen in Figure 3.2. So what will the bridge look like? With feedback and further in-depth research, the bridge will be an evidence-based tool designed with valid and reliable findings to support a web-based resource that facilitates CI learning that results in an augmented student-learning environment. Therefore, the final assessment would be the measure of success for both the CI and the student.
Chapter 4 Methodology

This chapter begins with an exploration of the mixed methodology of this study beginning with a description of the online module design. Review of the research design including a discussion of the participants, setting, and procedures follows. Next, is an in-depth look at data collection and analysis with selection bias, research questions, and hypotheses. Lastly, due to the influence of qualitative methods in this study, a discussion on trustworthiness and dependability concludes the chapter.

Online Module Design

Theoretical frameworks in module design. Several elements played a part in the design of the learning module. To begin, constructivism played a strong role throughout the learning experience. For instance, a hyperlink within the module led to a wiki where the learner provided peer feedback to specific inquiries about the module and clinical experiences. This specific task created a social constructivist element. This was because of asynchronous peer interaction led to the construction of knowledge in an online group venue that was different from within the module where knowledge construction occurred between the learner and computer. The module had a PBL approach grounded in constructivism. This was evident early in the module when the learner was initially presented with a problem that eventually required the learner to draw on past experiences, learn new content, and explore self-reflection. For example, the student in the vignette was asked by the CI to prepare for the following day’s patient caseload and did not comply. Instead, the student was observed texting and looking through a magazine during downtime in place of researching articles for an unfamiliar patient diagnosis. The student’s behaviors presented the problem that the learner had to wrestle with for the next hour.
SRL guided the design to where facilitation of learner motivation occurred. The key to incorporation of SRL was giving the learner the ability to have choices when answering module questions and providing control to the learner for what direction the case would unfold. This happened by promoting multimedia interaction throughout the module along with decision points that allowed the learner to go in different directions. This will be discussed further later in this section.

The third component of the theoretical framework was ALT. This theory centers on what the adult brings to the learning experience. The theory states that the adult learner needs to be able to engage previous experiences, autonomy, and social and critical thinking skills. With this in mind, by providing an authentic case to where the learner could make decisions based on their experience along with new content gave the learner the opportunity to utilize all of the above descriptors to maximize the environment through the intentional design of the online module.

Thus, these components forged a partnership in the module design where an authentic case built on learners’ previous knowledge, experiences, and peer feedback to become an integral part of the web-based learning environment.

**Structure and content of module.** The software program, Articulate®, provided the platform for the module and PowerPoint supplied the learning environment. The module was composed of a series of alternating linked video vignettes and text-based instructional slides. It began with an introduction, learning objectives, and a pre-test. Next, it launched into a short vignette to set the stage for the educational experience. The content following the vignette stressed for the CI to be proactive with the student by providing a thorough orientation. The
Figure 4.1. The video vignettes provided modeling of the behavior CIs may exhibit in order to achieve a positive outcome when confronting a student about unacceptable behavior.

Subsequent vignettes initiated a sequence of CI and Center Coordinator of Clinical Education (CCCE) discussions about a student who decompensates in the midst of her clinical rotation with issues centering on the failure to incorporate CI feedback. The CCCE served as a consultant and supervisor of the CI throughout the module. The Professional Behaviors are introduced in the content slides along with how to complete a remediation plan. Additionally, the adoption of active listening strategies added to the skills that are available to help the CI coach the student on how to get back on track. In Figure 4.1, the learner observed the CI confronting the student about her behavior in clinic. The learner was able to see how the CI modeled characteristics that underscored the content from the preceding slides.
Figure 4.2. Screenshot of Decision Point Slide

The decision point slides in the learning module provided the learner an opportunity to choose how they would proceed if they were the CI in the scenario.

Another opportunity for the learner to embrace the online experience is illustrated in Figure 4.2. Decision point slides allowed the learner to interact with the module by clicking on a hyperlink and to choose which decisions s/he would make if s/he were the CI in the scenario. If the learner chose the less desired option then the learner was eventually redirected to the more appropriate path only after the consequences of their decision were disclosed. The decision points enabled the learner to engage in the module by providing the opportunity to explore new possibilities of how to deal with these types of situations without having to suffer real life entanglements. After exposing the learner to the complete series of CI/CCCE vignettes and instructional slides, the module ended with a positive resolution and the learner then took a
Research Design

There are several components of the research design to consider. To start with, this was a quasi-experimental design where the participants were not randomly chosen from the population. Thus, it was not a randomized trial. More specifically, it was a non-equivalent, control-group design where the treatment group had pre and post measures (Gall, Gall, & Borg, 2007). Figure 4.4 illustrates the study design.

The “N” represents the non-randomized assignment. This was necessary as the CIs were paired with the students dependent upon their clinical placement, thus the population was predetermined. The “O” demarcates the various stages of measurements that occurred. The subscript “S” represents the students and the subscript “CI” is, of course, the CIs. The “X” is representative of the intervention which was the online learning module delivered to the CIs that were in the treatment group.

With the experimental design outlined, the next section will cover the participants, setting, and procedures for data collection.

Data Collection

The participants of this study consisted of two distinct groups – CIs and students. I will
begin with describing the former. The CIs for this study mentored physical therapy students for the third clinical rotation in a DPT curriculum. All CIs were licensed physical therapists with a range of experience from one to 24 years as a CI and one to 43 years as a PT. On average, the CIs had nine years experience as a CI and 13 years experience as a PT. There were 17 females and four males, which is consistent with the gender breakdown for the physical therapy profession. Eight CIs had DPTs, eight had MPTs and five had bachelor's degrees in PT. Fifty-seven percent were credentialed CIs and 33% were APTA members. The third year DPT students formed the second group of participants. They were experiencing their third of five clinical rotations in their academic training during this study. The ages ranged from 23 to 28 years old with an average of 25.84. There were twelve female and seven male students. All students had undergraduate bachelor’s degrees. The CIs worked with our DPT students in clinics that were located throughout the greater Cincinnati area and across the United States. These PT clinics provided learning experiences for students in the outpatient, inpatient, pediatric and chronic care settings. Therefore, the study’s setting was across these clinical experiences and in the online environment. The clinics enabled CIs to practice the new tools they gleaned from the module. The online environment housed the learning module, pre-test, immediate post-test, delayed post-test and focus group. With the participants defined and the setting depicted, the procedure for the study unfolds next.

The procedure began with student and CI recruitment. Recruitment of the students occurred after the placement process concluded for their final clinical rotations. This order of events was important so that the students would not perceive the quality of their placement hinged upon consent. For CI recruitment, I followed PT clinical education protocol. The CCCE was contacted first to confirm who the CI would be and obtain permission to contact them for
potential consent for participation in the study. Once consent was received, this determined which students would be eligible to actually participate in the study due to the pairing of CI to student required for completion of one of the data collection tools. Due to three CIs declining participation, three students were unable to go any further. From there, the CIs were assigned to either the treatment or the control group through the Excel random assignment function. CIs in the treatment group were asked to take the online learning module which housed a pre-test and immediate post-test. The control group would only take the pre-test that was called a baseline worksheet. The treatment group-CIs were also asked to participate in a wiki as a part of the online learning module. The wiki involvement at the end of the module accomplished two important tasks. First, it underscored the importance of learning best practices as the CIs were asked about how the tools presented in the module could be used in their everyday clinical practice. Second, the CI participated in providing peer feedback and teaching in their posts as they commented on each other’s thoughts and shared clinical education insights. This was a significant piece to their learning as it also reaffirmed the use of the social constructivist paradigm. The online module was available to the treatment group-CIs throughout the nine-week rotation for them to refer to as often as they deemed necessary. However, the hyperlinks were disengaged so as to not allow inappropriate data to be collected in the pre and post-tests.

Upon conclusion of the nine-week rotation, the paired students completed a confidential CI assessment form. The treatment group-CIs completed a delayed post-test and participated in a focus group. The final step in the study occurred after a nine-week, inactive period after which the treatment group-CIs completed a follow up worksheet. This step concluded the data collection aspect for this study. See Figure 4.3 for a representation of the procedures and note
Figure 4.3. Procedure of the study flows from the recruitment of students to the final data instrument of the CIs.

how the research design becomes more apparent. With the procedures for the study described, the next area to cover will be data analysis that coincides with each research question, hypothesis, and theme statement.

Data Analysis

Selection Bias. The data analysis required to examine the presence of selection bias for the CIs included two sets of calculations. First, a look at the CI sample as it related to the CI population enabled me to discuss the potential generalization of the findings to the population. This required the use of descriptive statistics. Second, comparison of the control group to the treatment group provided the footing to assess if the treatment group was representative of the sample. The analysis required a Mann Whitney U for the quantitative portion and Grounded Theory for the qualitative portion. Calculation of selection bias for the student participants was not applicable due to student eligibility being pre-determined by the CIs consent to participate.
**Research question one (RQ1).** The first research question focused on the CI. It asked, “To what extent and in what ways do CIs perceive the usefulness of the online module in improving the quality of mentoring of DPT students in the clinic?” The associated hypothesis (HYP1) stated that the CI would find the module helpful as reflected in the data collected with increased ratings and themes (THM1) would demonstrate module-taught best practices.

Both quantitative and qualitative methods were used in order to answer this question. While taking the online module, the treatment group-CIs completed a pre-test (see Appendix A) that contained both qualitative and quantitative features. After completing the module, they completed the immediate post-test (see Appendix B) that contained only the qualitative questions that originated from the pre-test. The delayed post-test (See Appendix C) also contained both types of data points. The quantitative piece was in the format of a Likert Scale that originated from the pre-test that underwent analysis using SPSS with a Wilcoxin Signed Ranks test. Factors that dictated the use of this specific test were twofold. One, the Likert scale represented a non-parametric design with the use of a pre- and post-test. Second, the samples used were dependent samples.

Considering the qualitative aspects of these tests, short essays were analyzed using Grounded Theory (Strauss & Corbin, 1998). Strauss and Corbin provided foundational guidance in how to analyze qualitative data through a series of coding steps including open, axial, and selective coding. By following these steps, themes in the data became apparent and model development occurred.

The pre- and post-tests primarily served to assess the amount of learning that took place as a result of participation in the learning module and acted to establish a baseline. The CI committed to which best practices they would incorporate into their typical mentoring routine in
the immediate post-test. The delayed post-test followed the completion of having a DPT student in clinic for nine weeks. This second post-test enabled the assessment of the existence of any long-term best practices by observing if the CIs had employed the strategies learned from participating in the module. A focus group followed for the treatment group-CIs after they completed the delayed post-test. Two focus groups were held in order to provide flexibility for the participants and to maximize the participants’ voices. The focus group facilitated social constructivist-like networking where the CIs engaged in synchronous peer interaction to provide feedback and assessment of the effectiveness of the module. (See Appendix D for the focus group interview guide.) The control group-CIs only took the pre-test and did not participate in any of the other research activities.

**Research question two (RQ2).** The second research question centered on the DPT students’ perceptions of the CIs’ performance. This took into account an external measurement of the CI’s performance and added a piece of evidence to the overall picture. RQ2 asked, “To what extent and in what ways do DPT students assess the effectiveness of the performance of the CIs who complete the online module?” The hypothesis claimed that the students would rate module-taught CIs higher than non-module taught CIs as seen in the quantitative ratings. The themes generated from the analysis of the short essays would reveal CI module-taught best practices observed and experienced by the students.

In order to answer this question and to test its hypothesis, the students completed a confidential feedback form (see Appendix E). Traditionally, completion of this form occurs at the end of every clinical rotation. What was unique to this specific instrument for this aspect of the research study was that it underwent validity testing where a group of colleagues led by a survey expert fully vetted the Likert scale in order to provide a level of validity that would be
more valuable than face validity. As a result, it is believed that this instrument also has content validity indicating the survey aspect of the instrument was representative of the content being measured. This form specifically asked questions as it related to the online learning module objectives. With respect to reliability of this instrument, a Cronbach’s alpha test was performed. According to Gleim and Gleim (2003), when an instrument has a Likert scale it is important to calculate this coefficient in order to establish internal consistency. Additionally, since Cronbach’s alpha requires a single test administration, it was appropriate to use this test due to its congruency with the study’s research design. Lastly, with the use of the Likert Scale to obtain quantitative data along with independent samples, the Mann Whitney U test was employed. Qualitative data was analyzed using Grounded Theory (Strauss & Corbin, 1998) in order to look for themes as previously outlined.

Research question three (RQ3). The final research question explored whether CIs incorporated any of the best practices taught 20 weeks prior to the date of the last assessment.

RQ3 posed, “To what extent and in what ways do CIs maintain module-taught, best practices after a nine-week inactive period?” The hypothesis, HYP3, stated that the CIs would utilize best practices as a key resource in order to answer questions from the hypothetical case. The themes, THMs3, would support the quantitative hypothesis by demonstrating continued use of the best practices after an inactive period equal to the length of the student’s rotation.

The path to answer the last research question and test this hypothesis was for the CI to complete a follow up worksheet (See Appendix F). The worksheet walked the CI through a student scenario that required the CI to reveal best practices that they would use to assist this “problem student” by facilitating a successful outcome to the clinical experience. It used short essay questions whose answers were analyzed with the Grounded Theory (Strauss & Corbin,
1998) approach. With each short essay question, there was a critical quantitative piece. It specifically asked what percentage of resources available to the CI were used to answer the questions. (a) Did the CI use personal experience, (b) previous continuing education classes such as the CI Credentialing course, (c) content from the learning module, or (d) consult another therapist, supervisor, or university faculty? By adding these two pieces together, short essays and percentages of used resources, evidence, or the lack thereof, of best practices being integrated into the clinical education environment could be identified.

Descriptions of each of the research questions, hypotheses, instruments, validity, reliability, and data analysis as it related to the research study has been provided. Since the study also possessed a strong qualitative focus, a discussion on trustworthiness and dependability follows.

**Trustworthiness and dependability.** At this point in the review of the methodology, it is important to discuss how trustworthiness and dependability (similar to validity and reliability in quantitative research) were woven throughout the qualitative aspects of the study. In regards to the design, a built-in audit trail reflected stringent steps taken to insure the trustworthiness and dependability of the study. This trail included researcher notes and logs to confirm each step planned in the methodology was obeyed (Lincoln & Guba, 1985). Additionally, “participant transcription” contributed to the integrity of the study where the CI participants in the online focus groups typed their responses to the researcher’s guided questions. This eliminated potential errors in transcription. After the focus groups, a member check was performed to insure the concepts generated from the focus group reflected the actual findings (Mertler, 2006).

For the peer review aspect of trustworthiness, an external qualitative coder, from the field of education, reviewed the data to perform open, axial, and selective coding. These coding steps
are in alignment with Grounded Theory. Open coding requires a constant comparison of codes to
insure no duplication occurs. Axial coding serves to put the codes into categories or themes and
then links the themes together to create a relational statement. The final step in coding is
selective coding. This step requires the development of a theoretical scheme that eventually
evolves into a core category. With this in mind, having an external coder allowed the primary
researcher to triangulate the data results. From the viewpoint of dependability, the external coder
served to provide another layer of reliability for the study. The qualitative analysis process began
by examining the literature to create an appropriate coding scheme. The work of Veldhuis-
Diermanse (2002) served as the basis to outline how the coding scheme should be approached.
According to Veldhuis-Diermanse, when the theoretical background centers on social
constructivism as a foundation for knowledge construction, then the thematic unit should be the
unit of analysis. This protocol is congruent with the theoretical framework for this research
study. Another aspect in developing the coding scheme was the unit of meaning. The unit of
meaning was in the message; therefore, its length was independent of where it originated and it
was not limited to a single sentence. Additionally, not all sentences needed to be coded (De
cites percent agreement and the use of Cohen’s kappa as the protocol for inter-rater reliability.
Thus, both of these were performed for each of the appropriate data collection instruments.

The coding scheme that was sent to the external coder was as follows:

- Utilizing Grounded Theory as outlined by Straus and Corbin (1998)
- Read through participant responses at least one time through before beginning to open
code
- The unit of analysis is the thematic unit not the entire message
• If there are more than one idea/theme/potential codes within a message then it is important to have the freedom to express multiple codes; however, not all sentences need to be coded
• “In vivo” coding is encouraged, as appropriate
• Codes do not need to have a set length or consistency of length
• Document codes above the thematic unit that are being analyzed
• When using “in vivo” coding, place quotation marks around the thematic unit and there is no need to rewrite the in vivo code above the thematic unit

After the external qualitative coder completed open and axial coding, the researcher and coder met and compared open codes and categories. Investigation of codes and categories generated by the researcher and external coder were assessed to determine at what level of initial and ultimate agreement occurred. Reconciliation of categories and codes took place and discussion of potential themes with model development came next. There was an overall initial 92% agreement of coding and eventual 100% agreement after negotiation. An additional layer of dependability occurred where inter-rater reliability was further tested through the use of Cohen’s kappa statistic. Thompson, McCaughan, Cullum, Sheldon, and Raynor (2003) found that using the multi-rater kappa statistic helped measure the level of agreement of coding that may not have occurred by chance. Cohen’s kappa formula that was used for this study was:

\[ K = \frac{p - p_e}{1 - p_e} \]

In the formula \( p \) stands for the proportion of units that were in agreement and \( p_e \) stands for the proportion of units that would be expected to agree by chance (Bland, 2008). The final layer of dependability came with performing intra-rater reliability by also using the above Cohen’s kappa formula. Hu et al. (2011) suggested a three-week interval when performing intra-
rater reliability testing. Thus, the procedure for this study was for the primary researcher to code and categorize the data, then three weeks later re-code and categorize the data to check for consistency in coding. Individual kappa statistics for both the inter-rater and intra-rater reliability of each of the data collection tools with the exception of the follow up worksheet was calculated and is reported in Chapter 5.

Lastly, the final layer of trustworthiness and dependability is that the dissertation paper possesses an extensive description of the research process with a focus on procedures and limitations so that a consumer of the research can have increased confidence in the study (Maykut & Morehouse, 1994). Altogether, these factors strengthen the veracity of the findings of this study. With the methodology shared, findings of the study will follow.
Chapter 5 – Findings

In this chapter, the findings as they relate to selection bias along with how they relate to each of the research questions posed in Chapter 1 will be presented. For each research question, exploration of the quantitative analysis will come first, followed by the qualitative analysis. Next will be a description of the emergent themes and the revised CI Best Practices Education model. Lastly, the findings from the reliability testing with respect to Cronbach’s alpha and Kappa statistics will complete the chapter.

Selection Bias

The findings from the data analysis of the comparisons made between the sample and population will appear first then the control and treatment groups’ findings will come next in order to define the role of selection bias in the study. As mentioned earlier, the CI participants in the sample came from the population of CIs eligible to participate during the third clinical rotation of the DPT students’ academic preparation. Due to the size of the population, the annual CI database statistics were included as it represents CIs used throughout the academic year. Table 5.1 provides descriptive statistics to compare the CIs from the sample, population, and annual CI database.

As described in the previous chapter, the control group-CIs completed a baseline worksheet that was identical to the treatment group-CIs’ pretest. The Likert scale scores for each of these data collection instruments underwent analysis using the Mann Whitney U test. The four items inquired about the CIs’ perceptions of their ability to establish the groundwork for a successful rotation, work through a significant issue in clinic, implement strategies using active listening to facilitate conflict resolution, and to work with the Professional Behaviors to improve student behavior. The results of running this test for question items one through four ranged from
Table 5.1

**Comparison of Groups**

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>Population</th>
<th>Annual CI Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (n=___)</td>
<td>21</td>
<td>24</td>
<td>117</td>
</tr>
<tr>
<td>Years as a PT</td>
<td>13.26</td>
<td>14.69</td>
<td>12.39</td>
</tr>
<tr>
<td>Years as a CI</td>
<td>9.45</td>
<td>10.73</td>
<td>9.28</td>
</tr>
<tr>
<td>PT Degree</td>
<td>BS = 23.8%</td>
<td>BS = 29.2%</td>
<td>BS = 27.4%</td>
</tr>
<tr>
<td></td>
<td>MPT = 38.1%</td>
<td>MPT = 33.3%</td>
<td>MPT = 46.2%</td>
</tr>
<tr>
<td></td>
<td>DPT = 38.1%</td>
<td>DPT = 37.5%</td>
<td>DPT = 25.6%</td>
</tr>
<tr>
<td>Credentialed CI</td>
<td>Yes = 57.1%</td>
<td>Yes = 54.2%</td>
<td>Yes = 47%</td>
</tr>
<tr>
<td></td>
<td>No = 42.9%</td>
<td>No = 45.8%</td>
<td>No = 53%</td>
</tr>
<tr>
<td>APTA Membership</td>
<td>Yes = 33.3%</td>
<td>Yes = 29.2%</td>
<td>Yes = 35%</td>
</tr>
<tr>
<td></td>
<td>No = 66.7%</td>
<td>No = 70.8%</td>
<td>No = 65%</td>
</tr>
</tbody>
</table>

Note: BS = Baccalaureate, MPT = Master’s of PT, DPT = Doctor of PT

46.50 to 55.50. A score of 30 or less would have equated to a p value equal to or below the .05 level. This would have indicated a significant difference between the two groups. Therefore, there is quantitative evidence to support that the two groups were similar. With respect to the qualitative portion, multiple common themes came from the baseline worksheet and pretest. For the first question concerning incorporation of feedback, themes included “documentation,” “review of expectations,” and “detailed guidance with learning.” The following quotes reflected the strong similarities between the groups’ responses:

*Continue to provide feedback to the student along with giving them the opportunity to explain why they did not incorporate feedback.* [Female Control Group-CI: 12]
Ask them about their perception of the feedback and then their comprehension of the feedback, ask them if the feedback applied to a single situation or if applicable in more than one situation or from now on. [Female Treatment Group-CI: 22]

The only outlier came from the control group where one CI reported a need for stronger language in a plan.

The questions regarding consequences of not addressing student issues as well as items missing from a Professional Behaviors plan had similar themes with minimal outliers. The question asking about knowledge of May’s Professional Behaviors, there were equal numbers of CIs in both groups that were not aware of what the Professional Behaviors were.

The final question on both data collection tools related to the necessary steps needed in order to insure a successful outcome. Themes generated from both groups focused on “transparency with expectation,” “review of the plan,” and “follow up.” The only outlier came from the control group where the participant desired to inform the DCE. An example of the similarities is as follows:

*Regular follow up meetings to ensure that the plan is being followed.* [Female Control Group-CI: 14]

*Must have follow up meetings with the student to address progress.* [Female Treatment Group-CI: 6]

Thus, there was no detected difference between the themes generated from either tool. This combined with the quantitative findings strongly suggest that the control group and the treatment group were very similar.
Table 5.2

Quantitative - Comparing Pre-test to Delayed Post test

<table>
<thead>
<tr>
<th>Questions from Likert Scale</th>
<th>Means</th>
<th>Minimum Score</th>
<th>Maximum Score</th>
<th>Wilcoxin Signed Ranks Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 – Establish groundwork</td>
<td>Pretest 3.307</td>
<td>2</td>
<td>4</td>
<td>.046</td>
</tr>
<tr>
<td></td>
<td>Delayed 3.667</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Q2 – Work through student issue</td>
<td>Pretest 2.539</td>
<td>1</td>
<td>4</td>
<td>.058</td>
</tr>
<tr>
<td></td>
<td>Delayed 3.083</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Q3 – Active listening with conflict resolution</td>
<td>Pretest 3.308</td>
<td>2</td>
<td>4</td>
<td>.180</td>
</tr>
<tr>
<td></td>
<td>Delayed 3.358</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Q4 – Use Professional Behaviors</td>
<td>Pretest 2.615</td>
<td>1</td>
<td>3</td>
<td>.068</td>
</tr>
<tr>
<td></td>
<td>Delayed 3.168</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

Research Question 1 (RQ1)

RQ1 stated-- *To what extent and in what ways do CIs perceive the usefulness of the online module in improving the quality of mentoring of DPT students in the clinic?* The data collection instruments used to answer this question included the pretest, immediate post-test, delayed post-test, focus groups, and follow up worksheet. RQ1 had both quantitative and qualitative aspects; the quantitative analysis will come first.

 BYUoutitative analysis. The Wilcoxin Signed Ranks test compared the responses of the Likert Scales of the pretest to the delayed post-test. The treatment group completed both of these instruments. Timing of the administration of the pretest was prior to taking the online module and the delayed post-test immediately followed the 9-week student rotation. Table 5.2 illustrates the scores of the pretest and the delayed post-test with the associated Wilcoxin Signed Ranks test. Keeping in mind a target of .05 level of significance, Q1 achieved significance with Q2 and Q4 missing significance by .008 and .018 respectively.

The follow up worksheet contained the other significant piece to answering the quantitative aspect of RQ1. Question 12 from the follow up worksheet asked CIs what level of
Figure 5.1 This demonstrates how effective the CI participants believed the module to be in influencing their effectiveness in mentoring DPT students in the clinic.

effectiveness they had when mentoring DPT students in the clinic as a result of taking the online module. As a reminder, the CIs completed this tool after a 9-week inactive period. They had just completed a complex case in this worksheet and had to reflect upon the best practices they learned 20 weeks earlier when they formulated their answers. The choices were “no change in level of effectiveness,” “minimally more effective,” “moderately more effective,” and “extremely more effective.” Eight CIs chose “moderately more effective,” which equated to 66.7%. Three CIs chose “extremely more effective” and one chose “minimally more effective.” None of the CIs selected “no change in level of effectiveness.” Figure 5.1 illustrates these results.

Qualitative analysis. Open coding and deriving themes from the pretest and post-tests’ data led to painting a picture of the CIs’ abilities to work with students in the clinic. Discussion about the effect of the module on the CI’s mentoring abilities will occur in Chapter 6. In order to pose this discussion an analysis of these tools was necessary. Beginning with the pretest, the
responses to the short answer questions lacked consistency and had codes saturated with experiential expressions. For example, responses to a question asking about how to work with a student that does not incorporate feedback, the CIs stated:

*Define direct objectives that need to be completed in order [to] achieve successful outcomes.* [Female CI: 15]

*I will repeat feedback. Give feedback in writing and establish guidelines for following through with recommended feedback.* [Female CI: 21]

Additionally, when asking CIs to report missing items from a Professional Behaviors plan, the CIs responded by stating:

1. *I do not think all areas of the problem are addressed in the plan for development. For example, nothing listed in the plan to improve communication between student and CI.* 2. *Not sure what other items are missing.* [Female CI: 6]

*More reference than “bringing books to the clinic”. Not only should the student NOT be on the phone or checking e-mails during clinical time, ... effort should be made on the student’s time to research not only diagnoses but treatment strategies.* [Female CI: 21]

In comparison to responses to the same questions by the same CIs, the post-test yielded the following answers with respect to lack of incorporation of feedback by the student:

*Set up a meeting either with or without a formal plan, talk to the CCCE, and ensure that the student is understanding what is expected of him or her.* [Female CI:15]

1. *Set up a meeting; discuss professional behavior that needs to be addressed. 2. Ask student to write a plan indicating behavior to be addressed, example of behavior and what the student will do to improve in this area.* [Female CI: 21]
Likewise, the responses by the same CIs in the post-test yielded the following answers with respect to items missing from a Professional Behaviors plan:

1.) Not all of the behaviors are addressed in the plan for development 2.) No timeline regarding when the goals should be met is listed. 3.) Plan for development needs to add specific behaviors. [Female CI: 6]

Timelines for implementation. Meeting times set up with clear expectations, i.e. not testing or e-mailing at all during the clinical rotation. Setting up of meeting times is essential. Books should not be the only solution to not being prepared. There should be other avenues to utilize time wisely. [Female CI: 21]

Thus, the responses on the post-test became more consistent and more education-based rather than being experienced-based after taking the online module. With that said, open coding with constant comparison of the two data tools revealed themes including “effective communication,” “explicit guidelines and expectations,” “ongoing CI formative feedback,” “formalized mechanisms-structures for preventing and/or dealing with problems,” “students as reflective practitioners,” and “uncertain.”

The next step in the investigation of the CI participants’ responses in relation to RQ1 came about through examination of the second wiki forum. The wiki’s main purpose was to facilitate social constructivist interaction in order to construct new knowledge through asynchronous, peer interaction and mentoring. The first forum focused on integrating strategies from the module into everyday practice. The CIs had insightful responses to this prompt. The main purpose of this particular forum was to confirm learning and assist in integrating preferred best practices into the rotation that was about to begin. The second forum emphasized peer interaction to where the participants would comment on previous participants’ posts and to share
clinical insights and examples that came to mind during the module. This is where themes surfaced that related to: “student autonomy,” “accountability,” “having a written plan,” “previous experience,” and “definable goals.” For instance:

*I plan to have a formal meeting at least one a week... This would also give the student a chance to let me know if they feel that I need to intervene more or step back and let them experience more things on their own. This will allow the student to take more responsibility of their learning in a very structure[d], concrete format.* [Female CI: 11]

*... Based on the learning module I do see an advantage to using this approach if necessary because it requires “accountability” on both the part of the CI and the student. Having a written plan allows for a more objective experience and insures that the student either meets the goals or holds them accountable if they do not.* [Male CI: 8]

*I am reminded of a student who struggled the whole rotation with communication. Many informal meetings occurred as issues came about. ... It would have been much better to halt the problem with a formal plan. I have learned from my mistake and will have concrete tools for use going forward.* [Female CI: 25]

*I like how this tool clearly defines the problems, how to alter the pattern of behaviors and to clearly defines the goal.* [Male CI: 4]

Through these quotes, there was evidence to support that the participants had learned new practices and conceptualized how they may use these practices in future mentoring of DPT students.

This is an excellent segue to looking at the next data tool, the delayed post-test.

At the conclusion of the nine-week clinical rotation, the participants completed this tool. Aside from the previously discussed Likert Scale, the tool examined the CIs’ altered best practice they
used during the rotation and would use going forward in their mentorship of future DPT students. Constant comparison coding revealed codes like “listing pet peeves,” “action plan,” “orientation-ground rules”, and “employing active listening skills.” After saturation of these codes occurred, similar themes from the pretest and immediate post-test emerged.

Lastly, the focus groups and member checks concluded the qualitative section for answering RQ1. Two focus groups took place utilizing Adobe Connect. Nine of the twelve CI participants fully participated in the focus groups. One participant was late, one participant’s Internet was down, and one forgot to attend despite reminder emails being sent. The first question asked treatment group-CIs how many times they had returned to the module during the nine-week rotation. Four of the nine went back and two of the four went back twice. One of the nine stated she wish she would have gone back but failed to remember she had that option.

The second question of the focus group directly asked if the module was effective in teaching best practices for CIs. The responses consistently stated the module was effective; however, the participants identified different parts of the module that they felt were more useful than others. For instance:

... Nice resources, good framework for communication. [Male CI: 8]

It gave me some ground rules to use with a student with was helpful. [Female CI: 5]

I do think the module was effective for handling issues that may come up during a clinical rotation. It will definitely be something I remember to refer to in the future if any problems come up. I like the idea of having a plan of action. [Female CI: 15]

The third question asked the participants if the module was effective in improving the quality of mentoring of DPT students. This question is what facilitated some responses that
created a moderate level of dissonance in the data that would remain unclear until the member checks. Most of the responses were similar to these:

Yes, by helping us to get all of our CIs following the same objectives. [Female CI: 24]

Yes, I felt better able to meet with the student and address issues with a more structured format. I did find that I didn’t use the formal action plan because we had multiple issues, but it provided a nice framework to build from. [Female CI: 25]

Having been challenged by this past student, I found myself stretching in new areas to be a different and better CI. The module definitely helped me. [Female CI: 13]

Whereas this response was considered an outlier due to the fact it isolated the benefits of the module to novice CIs and excluded experienced CIs:

For me, I feel like I have always come close to what the module was teaching. I think for a newer CI it would be very helpful. [Female CI: 10]

Two other questions from the focus group also led to answering RQ1. One asked, “Do you feel more capable of working with challenging students than prior to taking the module, how so or why not?” The responses again were consistently positive. The other question referred to what would help a CI display best practices ongoing in their practice. Responses included:

Having the module available to be able to reference whenever a question or concern pops up. [Female CI: 11]

By establishing student and CI objectives & goals day one of the clinical. Then put this information in writing and have regular meetings to review those objectives/goals to make sure things are on track. [Female CI: 24]

Again, utilizing Grounded Theory to achieve saturation of constant comparison coding with in vivo codes developed consistent themes of “using the module as a resource,” “turning knowledge
The next step was to perform the member check to confirm that the themes were consistent with the participants’ intentions. The three randomly selected CIs consisted of one novice CI and two seasoned CIs. All member check participants agreed that the online module was useful in improving the quality of mentoring of DPT students as well as made them more capable of dealing with challenging students. The disagreement occurred with the intended target population for the module. Female CI: 10, a seasoned CI, stated that the module was more applicable to novice CIs as she had indicated earlier in the focus group. Female CI: 15, a novice CI, also agreed that novice CIs would benefit tremendously from taking the module but went on to suggest that since she wasn’t a seasoned CI yet, she did not feel she could judge it accurately. Female CI: 24, a seasoned CI, disagreed with Female CI: 10’s perception. She felt that a novice CI might not understand the gravity of a situation, whereas a seasoned CI sees more value in implementing the module-taught strategies right away. She stated the module would be useful for a range of experience levels. Thus, the member check confirmed the themes generated from the data analysis of the focus group and added clarity to the potential audience for the module.

Thus, the data analysis for RQ1 showed statistically significant improvement in the CIs perception that they would be able to establish the groundwork for a successful clinical rotation. The data missed being significant for the CI’s ability to handle student issues by .008 and use of the Professional Behaviors by .018. The qualitative analysis produced multiple themes that became apparent through the use of Grounded Theory. These themes will be built upon to demonstrate a revision to the proposed model later in this chapter.
Table 5.3

Control vs. Treatment Group Feedback

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Daily</th>
<th>2-3 times a week</th>
<th>Once a week</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Written</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Daily</th>
<th>2-3 times a week</th>
<th>Once a week</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal</td>
<td>8</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Written</td>
<td>0</td>
<td>1</td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: There were 10 treatment group students with 12 responses due to two students with paired CIs.

Research Question 2 (RQ2)

RQ2 asked -- *To what extent and in what ways do DPT students assess the effectiveness of the performance of the CIs who complete the online module?* The hypotheses required the data to show a difference between the students who had control group-CIs and the students who had treatment group-CIs. The data collection tool was the confidential form completed by the DPT students at the end of the nine-week clinical rotation. It is important to note that there were 12 responses for the treatment group even though there were only 10 students. This was because two students had two participating CIs so they assessed each CI. With that said, the quantitative analysis for RQ2 will come first.

Quantitative analysis. Ranges, means, and Mann Whitney U tests examined data that focused on frequency of meetings, types of orientations, ground rules, and clinical environments. Types of feedback and frequency of delivery, when comparing both groups, provided similar ranges after an adjustment for inconsistent group sizes as seen in Table 5.3.
Table 5.4

*Mann Whitney U Results*

<table>
<thead>
<tr>
<th>CI Mentorship Qualities</th>
<th>Mann Whitney U test</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI feedback empowered student autonomy</td>
<td>38.5</td>
<td>.064</td>
</tr>
<tr>
<td>Appropriate balance between positive and negative feedback</td>
<td>43.5</td>
<td>.072</td>
</tr>
<tr>
<td>Active listening utilized</td>
<td>49.0</td>
<td>.081</td>
</tr>
<tr>
<td>CI provided a positive clinical environment for development of professional behaviors</td>
<td>42.5</td>
<td>.071</td>
</tr>
<tr>
<td>Communication helped student achieve goals</td>
<td>48.0</td>
<td>.080</td>
</tr>
</tbody>
</table>

Note: None of the scores for these indicators were found to be significant (\(p \leq .05\)).

With respect to parking, appropriate dress, clinic hours, tour of facility, and introduction to other staff members, the answer options ranged from “strongly disagree” to “strongly agree.” Examination of the ranges demonstrated by both student groups stated either “agree” or “strongly agree” with the exception of one student from each group who stated, “strongly disagree.” Similarly, the responses for both student groups with respect to the quality of CI mentorship ranged from “strongly disagree” to “strongly agree.” The ratings weighed heavily on the “agree” and “strongly agree” columns. The averages for the control group ranged from 89% to 100% and for the treatment group from 91% to 100%. None of the control group-CI students rated their CIs less than “neutral.” Two of the treatment group-CI students gave ratings of “disagree” which resulted in a mean of 17%. This occurred in the category of the CI providing a balance of positive and negative feedback. Further analyses required the calculations of Mann Whitney U tests. The results of these tests are in Table 5.4. A significance level for the Likert Scale portion of the student confidentiality form was unable to be established. Next will be an examination of the qualitative analysis.
**Qualitative analysis.** The qualitative aspect of RQ2 centers on the DPT students’ assessment of the CI as it relates to CI effectiveness and module-taught best practices that are present in a preferred learning environment. To explore this qualitatively, the student confidential form had two short answer questions. The first question focused on CI effectiveness. Open coding comparisons found codes such as “answer any questions,” “provide feedback,” “open to student ideas,” and “autonomy” in both groups of students. Once saturation of codes occurred, two trends surfaced in the data. The first related to the type of in vivo codes used to answer the question. The control group had unique codes such as “bring answers to the table,” “available,” “willing to help,” and “provided adequate time.” The treatment group unique codes were “exposure to new situations,” “evidence-based practice,” “trust,” “provide supplemental reading,” “compassionate towards patients,” “very organized,” and “framework to learn.” When analyzing the codes as a whole from each student group with the intent to get to the axial coding stage of Grounded Theory, the control group students had codes that indicated a more experienced-based mentorship whereas the treatment group students had a more educated-based mentorship.

The second trend arose from the examination of the in vivo codes of four treatment group students’ responses to the question about CIs behavior that facilitate growth. They were:

*Offered suggestions for improvement of areas of weakness specific to patient handling and interaction. Encouraged me to take initiative in the early weeks of the rotation.*

*Provided reading material to supplement discussions or ensure my adequate preparation before the workday.* [Female CI: 13 Student]
...She allowed me to increase my caseload of patients as I was comfortable and knew when to step in if needed. She was also very organized which helped me learn more quickly. [Female CI: 11 Student]

Allowed me to be independent and figure things out on my own, openly communicated with me about expectations. [Female CI: 10 Student]

My CI was open to my ideas and was good about keeping watch on me to provide feedback. She was pushing me to use evidence-based practice and asked me questions daily as to my reasoning for the decisions I made in the clinic. [Female CI: 15 Student]

Balanced feedback, additional homework to enrich the learning experience, clear expectations through open communication, use of meetings that create a better understanding for student autonomy, organized approach, and evidence-based practice that facilitates clinical reasoning were topics that were heavily emphasized in the learning module. Instructions from the module are underlined in the above passages that were written by the students who have had no exposure to the module. These two emergent trends warranted additional examination in the following chapter.

The second short answer question concerned the ability of the CI to provide a rich learning environment. As seen in the first question, several commonalities appeared. Open coding found duplication of codes for both groups. Themes that emerged from the data included previous stated themes such as “students as a reflective practitioner,” “ongoing CI formative feedback,” and “formalized mechanisms” and an additional theme surfaced which was “learning style accommodation.”

Thus, looking at the quantitative piece there was no significant difference in the student ratings on the Likert Scale between the control group and the treatment group. Additionally, due
to the commonalities of the themes there was not a significant difference between the two groups for the CIs’ ability to provide a preferred learning environment. However, the groups were different with respect to CI behaviors that facilitated growth. Further discussion of the lack of significance found and the two notable trends in the data merited further discussion in Chapter 6.

**Research Question 3 (RQ3)**

RQ3 asked -- *To what extent and in what ways do CIs maintain module-taught, best practices after a nine-week inactive period?* To return for a moment to the focus group, one of the questions asked what would help a CI display best practices. Responses yielded codes such as “keep reviewing,” “having the module available as a reference,” “establishing ground rules,” “review the professional behaviors,” and “communication”. After nine weeks, the follow up worksheet served as the primary data source that sought to verify if the emergent best practices from the module that frequently appeared in the previous data tools would also surface in the worksheet in order to solve the fictional case.

**Quantitative analysis.** The follow up worksheet was a progressive case where the primary learning objectives from the module needed to be employed in order to successfully complete the tool. Ranges, modes, medians, and averages were calculated as each response required the CI to rank order what resources they used to develop their answer. The choices included “personal experience,” “consulting with another therapist, supervisor or DCE,” “online learning module,” or “other continuing education courses.” Table 5.5 illustrates each of these calculations. As the table indicates, the module served as a secondary resource to answer the questions with respect to orientation, getting the student back on track, active listening skills, and additional points. However, the module was a primary resource for developing the Professional Behaviors plan for the case. The ranges, modes, and medians aided in providing a
Table 5.5

Ranges, modes, medians and averages

<table>
<thead>
<tr>
<th>Question</th>
<th>Resource Used</th>
<th>Range</th>
<th>Mode</th>
<th>Median</th>
<th>Mean (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q2-Set up Orientation</td>
<td>Personal experience</td>
<td>25-90</td>
<td>50</td>
<td>55</td>
<td>61.25</td>
</tr>
<tr>
<td></td>
<td>Another therapist/Supr/DCE</td>
<td>0-30</td>
<td>20</td>
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<td>11.92</td>
</tr>
<tr>
<td></td>
<td>Online learning module</td>
<td>5-50</td>
<td>10</td>
<td>17.55</td>
<td>18.92*</td>
</tr>
<tr>
<td></td>
<td>Other Continuing Ed Course</td>
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<td>10</td>
<td>10</td>
<td>7.91</td>
</tr>
<tr>
<td>Q4-Help student get back on track</td>
<td>Personal experience</td>
<td>0-80</td>
<td>50</td>
<td>50</td>
<td>47.50</td>
</tr>
<tr>
<td></td>
<td>Another therapist/Supr/DCE</td>
<td>0-30</td>
<td>10</td>
<td>15</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td>Online learning module</td>
<td>10-60</td>
<td>20</td>
<td>22.5</td>
<td>28.33*</td>
</tr>
<tr>
<td></td>
<td>Other Continuing Ed Course</td>
<td>10-25</td>
<td>10</td>
<td>15</td>
<td>10.83</td>
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<tr>
<td>Q6-Setting up a Professional Behavior Plan</td>
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<td>0-90</td>
<td>0,20</td>
<td>27.5</td>
<td>32.12*</td>
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<td>0-20</td>
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<tr>
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<tr>
<td></td>
<td>Other Continuing Ed Course</td>
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<td>20</td>
<td>25</td>
<td>17.5</td>
</tr>
<tr>
<td>Q8-Active Listening Strategies</td>
<td>Personal experience</td>
<td>20-80</td>
<td>50</td>
<td>45</td>
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<td>25</td>
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<tr>
<td></td>
<td>Other Continuing Ed Course</td>
<td>10-50</td>
<td>25</td>
<td>25</td>
<td>14.16</td>
</tr>
<tr>
<td>Q10-Additional points to add to success of student rotation</td>
<td>Personal experience</td>
<td>0-100</td>
<td>100</td>
<td>72.5</td>
<td>62.92</td>
</tr>
<tr>
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<td>0</td>
<td>5</td>
<td>5.00</td>
</tr>
<tr>
<td></td>
<td>Online learning module</td>
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<td>0,10,25</td>
<td>20</td>
<td>22.91*</td>
</tr>
<tr>
<td></td>
<td>Other Continuing Ed Course</td>
<td>0-35</td>
<td>0,20</td>
<td>20</td>
<td>9.17</td>
</tr>
</tbody>
</table>

Note: The bolded numbers indicate the primary resource used for each item. The asterisk indicates the secondary resource.

more accurate portrayal of the scope of the CIs’ responses. In summation of the table, the CIs used personal experience 46.79% of the time to answer the prompts in the follow up worksheet. They used the online learning module 30.98% of the time, another therapist/supervisor/DCE 9.64% of the time, and another continuing education course 12.59% of the time. Omission of Q10 (additional points) from the overall data analysis was due to two reasons. First, its primary purpose was to discover what non-module taught best practices the CIs would suggest. Second,
eight of the twelve CIs responded but eleven of the twelve assigned percentages thus compromising the integrity of the quantitative responses to the question.

**Qualitative analysis.** The qualitative analysis for RQ3 had a threefold approach. First, there was a comparison of each CI’s individual responses to an answer key. Then an examination of the individual writing prompts that allowed those responses to be compared to the CIs’ responses to each other. Lastly, a comparison between the themes generated from the delayed post-test and focus group to the follow up worksheet.

**Individual responses assessment.** To begin, the open codes from the delayed post-test and focus group became the components of the answer key for the follow up worksheet. To answer a prompt satisfactorily, the requirement was for a response to have a match of a minimum of three key codes. Table 5.6 represents the number of matched codes that occurred between the answer key and the CIs’ responses. All CI participants met the established criteria for each item except for one. The exception involved Q6 that was about developing a professional behavior plan.

**Comparison of CI responses.** Next was the comparison of responses to individual writing prompts. Upon the second read of the data, open coding of the first question which was about setting up an orientation for the student in the case, produced frequently used codes such as “pet peeves,” “expectations,” “establish meetings,” “ground rules,” and “feedback.” The responses covered several important practices, for instance:

- *Prior to Ima arriving at the site, I would make a checklist for myself including necessary steps and materials of orientation, a time line with work tasks with specific expectations.*
- *I would contact Ima and inform her of how to prepare for the clinical e.g. background checks, dress code, hours, location, review materials, etc.* ... *I will have weekly sit down*
Table 5.6

Comparison of Open Codes

<table>
<thead>
<tr>
<th>CI Code</th>
<th>Question #2</th>
<th>Question #4</th>
<th>Question #6 Back on Track</th>
<th>Question #6 Professional Behavior Plan</th>
<th>Question #8 Active Listening Skills</th>
<th>Question #10 Other Best Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>6</td>
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<td>3</td>
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<td>3</td>
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<td>3</td>
<td>3</td>
<td>4</td>
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<tr>
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<td>6</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>4</td>
<td>3</td>
<td>2*</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4</td>
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</tr>
<tr>
<td>15</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>0</td>
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<td>21</td>
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<td>4</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: the asterisk (*) indicates an unacceptable answer that did not contain enough matched codes to confirm understanding of material.

meetings with her to discuss expectations (both hers & mine), progress and possible interventions to insure her success at this site. I will make apparent to her the appropriate line of communication. [Female CI: 21]

Block out time to formally meet with the student on the first day of the clinical. Outline expectations for the clinical, pet peeves, policies and procedures, review documentation, etc. [Male CI: 8]

In order to get the student back on track after issues with being tardy and establishing rapport, coding findings included “inform DCE,” “consequences,” “action plan,” “meet,” and “time-based goals.” Again, the responses were extensive as they addressed the issues the student was displaying including:
I would have a 1:1 meeting with the student to review expectations and areas of concerns. I would establish anticipated outcomes and discuss student issues. [Male CI: 4]

1) Develop a signed plan of action with the student 2) involve the ACCE/DCE with the plan and student status 3) frequent updates/feedback. Plan of action must involve consequences/ what will happen if behaviors continue. 4) Facilitate active involvement of student in establishing her goals for areas of concern. [Female CI: 24]

The case then progressed to placing the student on a Professional Behaviors plan. A majority of the responses for this item was extremely thorough; however, one of the shorter responses lacked depth and needed further development to cover the needed areas in order to have a complete plan.

I would have another formal meeting with her and involve her DCE in the meeting. [Female CI: 11]

Even though the CI stated she would have a meeting and get the DCE involved does not demonstrate that the CI has the understanding of the importance of the key components of setting up a plan. If she had included a minimum of three of the following key components such as set specific goals with time frames; insure it is a student driven plan, outline consequences or set up follow up meetings then there would have been a comfort level that she had some command of the material from the learning module. What is interesting to note is that she stated that she used the online learning module 60% to answer the question and 40% of another continuing education course. Thus, she may have been able to provide further information if encouraged to do so but at face value there was not any evidence to support this. To illustrate the more common response to this particular question:
I would have another meeting with her and with the CCCE, if necessary, to have Ima set specific goals for herself to ensure that she is truly recognizing the issues I have. I would have her highlight the professional behaviors that are a problem, set time frame specific goals, and then review it with her. [Female CI: 15]

The open codes from the data in this question included “goals with time frames”, “set up a meeting”, “inform DCE”, “student driven”, “provide examples of behaviors”, and “consequences”.

The next step in the case included active listening skills. The key codes focused on the strategies used to enhance communication. They included “eye contact,” “gestures,” “body language,” “validation of communication,” and “student driven.” In this question, it is important to note that the same CI that had difficulty with the previous question did distinctly better with this prompt. Her response was:

*Ask follow up questions, summarize and repeat her answers to make sure the answer are clearly communicated.* [Female CI: 11]

The final item (Q10) on the follow up worksheet asked if there were any other points the CIs would like to share about the incorporation of best practices that would help the student in the scenario have a successful outcome to her clinical rotation. The responses to this question either elicited anecdotal personal experiences, such as:

*Thru my experience: the sooner the better! Inappropriate behaviors need to be addressed immediately. Involving the ACCE/DCE helps to get the student’s attention quickly.* [Male CI: 4]

Or the responses offered a deeper understanding of the module-taught best practices, such as:
Listing out pet peeves in the beginning was extremely beneficial. Encorporating [sic] the professional behaviors is a difficult piece compared to clinical skills, the tools presented will offer helpful insights with future students. [Female CI: 22]

The responses, whether experiential or module-taught, to this question prompted a reference back to the assumptions noted in Chapter 3. One of the significant assumptions was the best practices selected to be a part of the module were indeed best practices that the CIs deemed important to integrate into every day clinical practice. By comparing the responses to this question to the module taught practices with qualitative analysis, it became evident that this was the case. Additionally, open coding for this specific question yielded axial codes such as, “involving DCE,” “feedback,” and “communication.”

**Comparison of themes.** The next step in looking at the qualitative data analysis for RQ3 was comparing the themes from the follow up worksheet and comparing them with the themes from the delayed post-test and focus group to assess if agreement occurred. The five themes were “effective communication,” “explicit guidelines and expectations”, “ongoing CI formative feedback,” “formalized mechanisms with structures for preventing and dealing with problems” and “student as a reflective practitioner”. Indeed five of the five themes were consistent across these data collection tools. Thus, there were no outlier themes from the comparison.

From the data analysis of RQ3, it was apparent that the findings indicated a need to revise the model from Chapter 3 in order to provide a deeper explanation of what was occurring in the transition between the “altered CI performance” and “future best practices” layers.

**Revision of the model**

The seven themes generated from the qualitative analysis from each of the data collection tools emerged as axial codes. These themes were then linked together to create a
A relational statement. The relational statement served to explain the how, what, why, and where a phenomenon was occurring in the data (Strauss & Corbin, 1998). The development of this statement also assisted in identifying outliers.

The statement was:

After taking an online learning module, CIs had an organized approach to mentoring DPT students including communication of guidelines, expectations, formative feedback strategies, and formalized mechanisms to help prevent and/or deal with problems that arise in clinic so that students can become autonomous, reflective practitioners.

The primary outcome of writing this relational statement was the identification and processing of inconsistencies in the data. This statement proceeded to claim the themes “uncertain” and “learning style accommodation” as outliers. Thus, the removal of the themes from the axial code data set allowed for reconciliation of the data.

The final step in the qualitative analysis was the selective coding phase. The primary purpose of this phase was to integrate and refine the theory that emerged from the data (Strauss & Corbin, 1998). The way that this was accomplished was the development of the core category. The core category served to explain what was going on in the data, represented the "voice" of the participants, and explains what the research study was about. The core category emerged as, “an online learning module facilitates continuous best practices through a reiterative process of immediacy of education, practice, and reflection.” With the core category defined, this provided the components necessary to inform how the revision of the model from Chapter 3 needed to happen. Figure 5.2 presents the reiterative cycle that will become a part of the model. Discussion of the process of how the revisions reflect the study’s findings occurs in Chapter 6.
Figure 5.2 *Online module revisions support clarification of how to maintain CI best practices*

*Figure 5.2* The revised model displays a reiterative process with a circular path of education, practice, and reflection in order to promote continuous best practices.

**Reliability**

**Cronbach’s alpha.** Cronbach’s alpha, as shared in Chapter 4, tests for internal consistency or reliability of a data instrument. The range of potential scores for Cronbach’s alpha is from zero to one with one representing a perfect correlation of all the items in an instrument whereas a zero demonstrates all items in the instrument are independent of each other. According to Gleim and Gleim (2003), scores that are:

- .9 or greater are considered excellent
- .8 to .89 are good
- .7 to .79 are acceptable
- .6 to .69 are questionable
Table 5.7

*Cronbach’s Alpha for Data Collection Tools*

<table>
<thead>
<tr>
<th>Data Collection Tool</th>
<th>Cronbach’s Alpha</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Worksheet</td>
<td>.770</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Pretest</td>
<td>.773</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Delayed post test</td>
<td>.770</td>
<td>Acceptable</td>
</tr>
<tr>
<td>Student Confidential Form</td>
<td>.833</td>
<td>Good</td>
</tr>
</tbody>
</table>

- .5 to .59 are poor
- <.5 are considered unacceptable

Cronbach’s alphas were calculated via SPSS for the baseline worksheet, pretest, delayed post-test, and the student confidentiality form. By reviewing Table 5.7, the scores ranged from being at an acceptable level to a good level. It is important to note that a Cronbach’s alpha was not calculated for the follow up worksheet. The goal for this worksheet was to not have internal consistency. This was because the intention of the prompts was to have the participants to consider each potential resource independent of each other.

**Kappa statistics.** It was essential to establish the dependability of the qualitative analysis for this study. The way in which this occurred was through examination of interrater and intrarater reliability using Kappa statistics. Kappa statistics enable researchers to report the strength of agreement of coding comparisons. Stemler (2001) reported the benchmarks for interpreting Kappa statistic results. The below reflects the scores that equate to the various levels of strength of agreement between the coders.

- 0.81 – 1.00 is Almost Perfect
- 0.61 – 0.80 is Substantial
Table 5.8

*Interrater and Intrarater Results*

<table>
<thead>
<tr>
<th>Data Instrument</th>
<th>Interrater Kappa</th>
<th>Level of Agreement</th>
<th>Intrarater Kappa</th>
<th>Level of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Worksheet</td>
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<td>Almost Perfect</td>
<td>1.00</td>
<td>Almost Perfect</td>
</tr>
<tr>
<td>Pretest</td>
<td>0.898</td>
<td>Almost Perfect</td>
<td>0.780</td>
<td>Substantial</td>
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<tr>
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<td>0.849</td>
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<tr>
<td>Student Confidential Form</td>
<td>0.934</td>
<td>Almost Perfect</td>
<td>1.00</td>
<td>Almost Perfect</td>
</tr>
</tbody>
</table>

- 0.41 – 0.60 is Moderate
- 0.20 - 0.40 is Fair
- 0.00 -0.20 is Slight
- <0.00 is Poor

Table 5.8 displays the Kappa statistics for both the interrater and intrarater reliability testing for this study. From the evidence above, it can be stated that based on the various levels of strengths of agreement, the coding for the study was strongly reliable.

Now that the analysis for each of the research questions, the revised model, and proof of reliability has been presented, the discussion of the study comes next.
Chapter 6 – Discussion

This chapter includes a discussion of selection bias and each of the research questions as they relate to their respective hypotheses and themes. A review of the threats to validity and reliability follows. The chapter concludes with a discussion on Type I and II errors.

Selection Bias

The evidence to support that selection bias was considerably minimized as it concerned the CI sample being representative of the population was carefully examined. The population consisted of all the potential CIs able to take a student during the third clinical rotation. The number of clinical sites that had agreed to take a student for that particular rotation predetermined eligibility. In two instances, students had two CIs so the CIs for the study outnumbered the students. There were 24 possible CIs and 21 chose to participate.

Due to the fact that this was a small study population, another comparison was needed. Each year, the PT program uses over 100 CIs to mentor students. The program collects demographic data points on each CI, which enables the program to look for trends. The data points include years of experience as a PT and CI, entry level-PT degree, CI credentialing, and APTA membership to name a few. These were the specific points used to compare the CI study sample, population, and annual CI database. Table 5.1 illustrated the comparison of each of these groups. The information from this table demonstrated that indeed the groups were similar to each other, thus minimizing selection bias.

With the sample being closely representative of the population, it is also important to note if the control and treatment group were similar. Achievement of this was best accomplished by comparing the control group responses on the baseline worksheet to the treatment group responses on the pretest. Analyses with the Mann Whitney U test were not able to establish a
level of significance quantitatively; however, the qualitative analysis revealed consistent similar themes. This supported the deduction that the groups were similar.

**Research Question 1 (RQ1)**

RQ1 asked -- *To what extent and in what ways do CIs perceive the usefulness of the online module in improving the quality of mentoring of DPT students in the clinic?* In order to answer this question, the use of a mixed methodology approach proved beneficial. To begin, the associated quantitative hypothesis was -- *CIs will have higher ratings of effectiveness on the delayed post-test, testing for the appropriate skills to work with DPT students in the clinic, than on the pre-test.* Analysis showed that not only did the means consistently increase from pre-test to delayed post-test but so did the ranges. The only stagnant range was the active listening prompt. The one prompt that was found to have a level of significance for this data tool using the Wilcoxin Signed Ranks test was “successful groundwork for orientation” (.046). The next closest prompts to being significant were “handling significant issues” (.058) and “working with a Professional Behaviors plan” (.068).

Regarding the two prompts that barely missed statistical significance, was likely due to the fact that CIs were encouraged to contact the DCE as an early warning system. When the student’s undesirable behavior was severe enough to warrant a Professional Behaviors plan, the expectation was that CIs contact the university to inform them of this and for the DCE to provide assistance as needed. Therefore, a minimal increase in guidance needed when a situation of this level occurred was not surprising. Thus, the fact that the mean scores were trending upward with a small sample size indicated the possibility of significance with a larger sample size. With that said, it is important to note that all that can be stated about these findings is that with this sample
the module provided treatment group-CIs the ability to establish the groundwork for a successful orientation.

Another piece of evidence to answer this research question was Q12 from the follow up worksheet. It asked the CIs what level of effectiveness they had as a mentor because of taking the online module. The CIs’ responses ranged from minimally to extremely more effective with eight CIs rating moderately more effective and three rating extremely more effective. Therefore, support is present for the hypothesis from the quantitative aspect of RQ1.

With respect to the qualitative aspect of RQ1, the associated theme statement was -- *The themes within the data will show that the CIs will perceive the online learning module to be useful in improving the quality of mentoring of DPT students in the clinic. This will be evidenced by the continued use of the strategies taught within the module. These themes will provide further support that the CIs have indeed learned from the module and are more capable of working with challenging students than prior to taking the module.* An examination of themes occurred in order to be able to determine the ability to either accept or reject the theme statement.

The themes emerged from the data in a progression consistent with Bloom’s Taxonomy. The initial codes, prior to taking the learning module, were experiential and scattered across the spectrum of potential clinical education interventions. However, as the CI progressed through the module and into the clinic for practice of their newly learned strategies, a transformation became notable. When the CIs took the delayed post-test, the themes had clearly moved from the basic level of knowledge demonstrated prior to taking the learning module through the use of experiential phrases, to higher levels of synthesis and evaluation. The CIs were becoming uniform in their approach to answering questions. The external coder also noted this. From the pre-test to the member checks, she stated that the progression through formalized learning to
intentional, explicit clinical application was evident. Additionally, the coder stated she was able to experience each step the CIs took through the learning process from their beginning knowledge base to learning theory, practical application, and reiterations of refining theory into practice through reflection. The themes revealed that the CIs did indeed learn from the module and were able to put these strategies into practice. Therefore, regarding the question asking if the qualitative themes support the hypothesis, the data analysis and methodologies support the theme statement.

To summarize, both the quantitative and qualitative findings were needed in order to answer RQ1. Thus, the findings from this mixed methods approach supported the hypothesis of the CIs achieving higher ratings in post-module data instruments as proposed in Chapter 1. Therefore, the null hypothesis was rejected as it related to this sample and the alternative hypothesis is accepted. Additionally, the thematic statement of the CIs using module taught-best practices after instruction is also accepted.

**Research Question 2 (RQ2)**

RQ2 asked -- *To what extent and in what ways do DPT students assess the effectiveness of the performance of the CIs who complete the online module?* This question also had a mixed methods approach. The associated quantitative hypothesis stated that the *DPT students will give higher ratings to CIs in the treatment group than the CIs in the control group on a survey instrument that asks specific information to reveal any integrated best practices taught from the online learning module.* Differences noted between the control group and treatment group were negligible. The Mann Whitney U test, median, mode and means scores were used as analysis tools to be able to fully address the research question. The analyses were unable to establish a level of significance. Therefore, the alternative hypothesis of the treatment group CI students
would have a superior experience in comparison to the control group CI students is rejected and the null hypothesis must be accepted.

The qualitative theme statement was -- *The themes within the student confidential form will show that the DPT students will perceive an enhanced level of CI effectiveness for the CIs in the treatment group. These themes will show that the module-taught best practices would be observed and experienced by the students as reflected in the data resulting in professional growth and a preferred learning environment for the DPT student.* An examination of themes occurred in order to determine whether to accept or reject the theme statement.

Data did not yield themes to support that the treatment group students had a superior experience to the control group students. However, the responses of the treatment group students clearly revealed a deeper educational experience as the words used to describe their learning environment and professional growth reflected having a more clinically, education-based CI whereas the control group reflected more of an experienced-based CI. In fact, three of the treatment group students used wording that came from the online module, to which they had not had any exposure. Thus, the themes did reflect a differentiated learning environment for the students of the treatment group-CIs. This indicated that there was evidence to support that the students in the treatment group had exposure to module-taught best practices.

There were additional factors that may have affected the students’ responses on the student confidentiality form. This clinical rotation was uncharacteristic as it related to student interventions. One of nine control group students had a clinical issue (11% of the control group). Four of ten treatment group students had clinical issues (40% of the treatment group). This is a higher than usual number of clinical issues during a single rotation. Research supports that rater mood has a significant impact on how a rater assesses another person (APTA, 2009). Simply
stated, the better the rater’s mood, the higher the ratings; conversely, the worse the rater’s mood, the lower the ratings. Due to the extremely high number of treatment group student interventions compared to that of the control group, this would translate into the strong possibility of skewed student ratings of their CIs.

Another factor of interest was a critique with respect to the timing of using the student confidentiality form in answering the question about treatment group students having a better experience than the control group. The themes conveyed a level of use of module-taught best practices; however, the quantitative work may have been better served at another time. The questions within the form focused on tasks that most CIs do e.g. orientation, meet with students, and listen to what students have to say. It is the level at which these tasks are done that needed to be differentiated. Unfortunately, the design of the data instrument did not differentiate between an experienced-based CI from a module-taught CI. Additionally, there may have been a better way to get to the answer by making a better choice of timing by taking into consideration what the students’ primary focus was in clinic. Students' focus tends to be on learning the skills necessary to pass the clinical rotation and ultimately pass the licensing exam. However, is a DPT student capable of reflecting, in the moment, the quality of their CI’s use of educational practices? It is standard procedure for DPT students to assess both publicly and confidentially their CI’s performance at the end of each rotation. The question that evolved was if students would be able to better assess their CIs mentoring performance from a perspective of looking back across all of their rotations and compare CIs in that manner. Further investigation of this question occurs in the next chapter. Thus, even though the form did not yield the hoped for quantitative results, qualitatively, the themes provided evidence to support a movement towards positive CI effectiveness as seen by the student.
To sum, both the quantitative and qualitative findings were needed in order to answer RQ2. The quantitative findings did not support the proposed hypothesis. The theme statement was moderately supported in that the students reported the treatment group-CIs provided a positive clinical environment for development of professional behaviors through use of best practices; however, it could not be established that the treatment group students had a superior experience to the control group students. Therefore, the alternative hypothesis was rejected and the null hypothesis was accepted. The theme statement was accepted with the stipulation listed above.

**Research Question 3 (RQ3)**

RQ3 asked -- *To what extent and in what ways do CIs maintain module-taught, best practices after a nine-week inactive period?* This question was consistent with the previous questions as it also had a mixed methodology approach. The associated quantitative hypothesis stated that *after a nine-week inactive period, CIs from the treatment group will utilize the best practices from the online module as a key resource in order to answer questions to a follow-up case that assesses their ability to work with a challenging student.*

The quantitative analysis involved the use of ranges, modes, medians, and means. The quantitative findings provided evidence that the CIs used module-taught best practices in order to answer questions in a complicated case of a challenging student. The online module ranked second (31%) consistently to personal experience (47%) as a resource for answers to the prompts in the case with the exception of the prompt that centered on setting up a Professional Behavior plan. In this prompt, the online module became the primary resource.

The qualitative theme statement was -- *The themes within the data will demonstrate that the CIs will maintain module-taught, best practices after a 9-week inactive period. This will be*
seen with the continued use of best practice strategies with how CIs choose to deal with a challenging student in a hypothetical case. These themes will serve to reinforce that the CIs indeed used module-taught best practices as a key resource in order to answer the questions from the case. An examination of themes occurred in order to be able to determine whether to accept or reject the theme statement.

Multiple coding comparisons and assessments resulted in several different findings. First, the individual CI assessment demonstrated that all of the CIs were successful in recalling the best practices in order to answer the prompts with the exception of a CI who did not answer the question about Professional Behavior planning thoroughly enough to express a grasp of that particular concept. Second, examination of the CIs’ responses with the individual prompts led to comparing emerged themes to themes from the delayed post-test and focus groups. Five of five themes across these three data tools were consistent with each other with no identification of outliers.

There is additional information to consider with respect to the calculated rankings of the resources used to answer the questions in the follow up worksheet. An exploration of the demographics of the treatment group-CIs uncovered a potential reason why the ranking of personal experience as the primary resource occurred in three of the four prompts. To explain, the follow up worksheet demonstrated the CIs used personal experience as a primary resource 16% more than the online module as they worked through the worksheet’s case. This fact led to an examination of the demographics of the treatment group-CIs. On average, the CIs in this group had 10.83 years of experience with a range from one to 21 years and a median of 17 years. This group also had an average of 14.75 years of experience as a PT with a range of four to 24
years and a median of 16 years. These demographics may have had a strong influence on CIs choosing to use personal experience as a primary resource over the module.

In summary, the quantitative findings supported the alternative hypothesis of using the online module as a key resource to answer questions to a follow-up case. Thus, the alternative hypotheses was therefore accepted. The null hypothesis was rejected. The qualitative findings supported the theme statement of the CIs demonstrating continued use of best practices after a nine-week inactive period. Therefore, the thematic statement was also accepted.

**Threats to validity and reliability**

Mertens (2010) outlined several potential threats to validity that applied to this study. With respect to internal validity, history is the first threat of concern. Half of the treatment group-CIs were credentialed CIs. The material covered in the credentialing class had several supplemental components included in the online module. There was potential for some of this supplemental information to be review for these participants. In order to control for this threat, all data were presented equally in the analysis and in the reporting of the findings. Avoidance of the maturation threat where the participants may experience psychological changes (fatigue) as a part of being in the study was difficult as there were multiple data collection points. Varying the types of data collection as well as keeping the survey data tools brief assisted in minimizing this threat. By having the immediate post-test and the delayed post-test literally divide the pretest material in half aided in avoiding the testing threat so that the CI participants would not become “test wise.” Control group threats to validity were immediately minimized as this group did not interact with the treatment group in any way and completed only one data collection tool for the study. Lastly, the novelty and disruption effect where the intervention obtains positive results simply because it is novel is plausible for this study as online modules for clinical education are
not commonplace at this time. This effect may have had a role in the initial positive responses. However, due to the consistency of the positive responses throughout the 20-week study and the active/inactive periods, the effects of novelty were diminished.

Threats to reliability also needed acknowledgment. Not all research agreed that the selected reliability tests for this study were without fault. Cronbach’s alpha has come under criticism for its primary assumption being one-dimensional in its estimation of reliability (Vehkalahti, Puntanen, & Tarkkonen, 2006). Despite these criticisms, Cronbach’s alpha remains one of the most commonly used tests for reliability in quantitative research due to the substantial evidence that supports its use. The Kappa statistic has also had its share of criticism. Kappa statistic’s critics state that it does not distinguish between differences in the sources in the data, that weighting of data may affect the score, and that there is potential for raters to weight the same categories differently (Uebersax, 2010). Thus, intentional steps were taken in the data collection with respect to measuring both interrater and intrarater reliability to minimize these concerns.

In qualitative research, reliability requires triangulation of data. The more sources used to confirm the results of the data, the more reliable the findings are. Confirming that each participant had a voice, equal representation of data, member checks, peer debriefing, researcher’s logs, and audit trails insured the integrity of the study. Each of these criteria were included to insure the study’s reliability.

**Type I and Type II errors**

Avoidance of Type I and II errors is critical to research studies. Type I errors occur when the researcher claims that there is a statistical significance when actually there is not. This would lead the researcher to incorrectly reject the null hypothesis. The significance of this type of error
is that the researcher may go forward and publish incorrect findings. Gravetter and Wallnau (2009) stated that this type of error usually occurs when a sample does not represent its population. This was the reason that selection bias was examined in such detail. By providing evidence that the sample was closely representative of the population, it decreased the likelihood of the existence of a Type I error.

Type II errors occur when the researcher claims that there is not a statistical significance when in reality there is. This causes the researcher to incorrectly accept the null hypothesis. Again, Gravetter and Wallnau (2009) stated that this commonly occurs when the effect of the treatment is not sufficient to move the mean into the critical region. Due to the size of the study’s sample as well as the findings that were close to being significant, this type of error may have been an issue in this study but it cannot be resolved with the current data. More studies in this area will assist in retrospectively establishing if there was a Type II error.

**Revised Model**

Figure 3.1, originally shown on page 43, illustrates a model that proposed steps detailing how CI education can facilitate a change from current practice to future best practices. The explanation that accompanied the model stated the integration of the module-taught best practices into CI practice would vary from CI to CI due to multiple factors such as years of experience, previous clinical experiences with students, and continuing education classes. There was an expected natural progression from “current CI practice” to “module intervention” to “altered CI performance.” However, the catalyst for the transition from “altered CI performance” to “future best practices” and maintaining that status in the outer layer of the model became the focus of this study.
The study had three research questions that focused on how to better prepare our CIs and the link between better preparation and an enhanced learning environment. The questions assessed effectiveness of an online module and its ability to influence best practices in mentoring DPT students in the clinic, and ultimately maintaining these CI best practices. In answering these questions, the findings suggested that by providing mental practice within the online module immediately prior to use of the content was beneficial to the participants. Having the module accessible during the clinical rotation also assisted in integrating the module-taught best practices. Additionally, distributed practice played a role in the learning experience where the CIs learned content, implemented the content in the clinic, revisited the content at the end of the rotation, had a nine-week inactive period, and then revisited the content for a final time. These on/off periods assisted the CIs in constructing sustainable module-taught best practices.

The module learning experience was not the only source for construction of knowledge that may have led to sustainability. The social construction of knowledge with the planned peer interactions, both synchronous and asynchronous, enabled the participants to have another valuable educational source. Knowledge through clinical application with their current students became the third source of knowledge development that was essentially learning by doing. These additional sources of knowledge assisted the participants in finding a deeper value of the module-taught practices.

Throughout the study, the CIs had multiple opportunities for reflection that enhanced their learning experience. Immediately following the pre-test, the wikis required active reflection about the module content as well as what other participants had to share. Through social networking and peer mentoring, the CIs created an environment of collegiality and knowledge scaffolding. Beyond reflection that occurred when working with students in clinic, further
Figure 6.1 Reiterative learning cycle

The reiterative cycle facilitates both the CI’s progression into the “Best Practices” layer and the ability to maintain position in that layer.

networking occurred during the focus groups where the CIs contemplated the questions posed and offered insights into their experiences from using the best practices they had recently learned. The final step, the follow up worksheet, gave the CIs one final opportunity to consider the module’s content including mental practice and reflection on the experiences of the past 20 weeks.

This led to the development of a diagram that reflected the findings from this study. The first step was to look at the reiterative process. The immediacy of education played a significant role in the study and initiated the cycle. It was beneficial for the CIs to implement the content within two weeks of learning it instead of implementing the content later, which is more common in traditional continuing education courses. Lastly, the planned reflection touch points completed the diagram. Figure 6.1 illustrates this reiterative cycle.

Taking this a step further, the cycle has the potential to become a continual process of lifelong learning. A goal of APTA’s Vision 2020 is for PTs to be reflective practitioners.
Figure 6.2. The revised model has the reiterative cycle that explains how CIs can get from the third layer to the outermost layer of the model.

This caused the reflection piece of the cycle to take on additional meaning. Reflection was an integral part of the study. As described, there were multiple planned reflections to help facilitate construction of knowledge. Another meaning for the reflection phase in Figure 6.1 is the reflective practitioner’s drive for lifelong learning. This drive promotes self-assessment, facilitates the uncovering of gaps in knowledge, and then promotes decision-making to fill those gaps. When those decisions translate into action, the cycle begins again.
Considering this information, the model was revised into its final form as seen in Figure 6.2. The first three layers remained the same. The reiterative cycle eliminated the boundary between the third and fourth layer. Intentionally removing the term “future” from the final layer and renaming it “best practices” served as a clarification to signify that best practices requires continuous effort on behalf of the CI to work through the cycle in order to achieve and maintain position in the outer layer.

The revised model cannot be generalized to the population of all CIs. Its primary purpose was to accurately reflect the findings from this study. By doing so, it provided a foundation for future studies. Implications for practice and future studies are covered in the final chapter.
Chapter 7 – Conclusion

This chapter begins with a discussion on the limitations of the study as it related to sample, methodology, and bias. Implications for future research come next. A summary of the study including background, purpose, and findings follows. A review of the clinical education gap and defining the composition of the bridge concludes the chapter.

Limitations of the Study

Sample limitations. Due to the nature of clinical education, the inability to randomize the participant selection process was unavoidable. Within PT programs, students are assigned to their clinical sites six to nine months in advance of their actual rotations. Placement in and of itself constructs a biased environment. Students are matched according to program requirements but also by skill set and personal characteristics. Student preference and personal attributes are heavily considered in matching with clinical sites. Each clinic has its own set of characteristics and occasionally its own set of idiosyncrasies that may or may not facilitate a student being successful in a specific clinic. The role of the DCE is to set both the student and CI up for success. Therefore, the match and eventual placement in clinic set the stage for non-randomization of the sample. What this means for the sample is the CIs could not be randomly picked from the 117 CIs that were used over the past year. Instead, the matching process and the decision for the study to take place during the third rotation of the students’ academic career predetermined the population from which the CI sample came.

Some of the CIs’ had characteristics that contributed to the limiting factors of the study. The APTA’s CI credentialing program, as stated earlier, had supplemental components that were a part of the online module. This had potential to give an edge to the credentialed CIs over the non-credentialed CIs. This was controlled for by delivering a pre and post-test and comparing
individual increases in scores. However, what was not controlled for was how many credentialed CIs were assigned to the control and treatment groups. Once the CIs from the population agreed to participate in the study, they were randomly assigned to the two groups. By chance, each group had the same number of credentialed CIs in it; however, the treatment group was larger than the control group so the percentages were dissimilar. The control group was composed of 67% credentialed CIs where the treatment group was composed of 50%.

One of the greatest limiting factors of this study was the small sample size. Due to this fact, there was a possibility for a Type II error. Several findings approached being significant but were not. A larger sample size would have brought greater credibility to the study. As a consequence, the results of the study were unable to be generalized to the greater population.

**Methodology limitations.** The methods in which data collection occurred had limiting factors as well. First, the student data collected for RQ2 demonstrated that the instrument used was not able to discern a difference between the control group-CIs and treatment group-CIs. A student focus group would have been a way to more accurately and confidently confirm or reject the quantitative findings regarding this question. By having a focus group for each set of students, it may have been possible to ascertain a clearer picture of whether or not the treatment group-CIs were able to provide a superior learning environment.

It would have provided a deeper meaning to the study if Q12 from the follow up worksheet would have also been asked on the delayed post-test. Q12 directly asked the participants if the module was effective in improving the quality of their mentoring skills. If this question had been asked immediately following the nine-week rotation and compared to the responses given after the nine-week inactive period, this would have provided the CIs’
perception immediately after having the chance to employ the module-taught strategies as well as added to the longitudinal integrity of the study.

The fact that the study was only completed after one rotation also was a limiting factor. This type of study could have more power if it could be repeated over multiple rotations with multiple programs gathering similar data. More of this will be discussed in the implications for future research.

Bias. Bias, as a limiting factor in this study, may have taken several forms as it related to the researcher, external coder, and participants. Beginning with researcher bias, the theoretical framework created a lens that played a role in developing the research design and performing the qualitative data analysis. Choosing one theoretical framework over others predisposed the study to potential bias. Together, constructivism (PBL), ALT, and SRT (SRL), provided an optimal learning environment for the participants and yielded strong findings. Selecting Grounded Theory over other data analysis methods provided data that may not have surfaced if another method was chosen. Likewise, other methods may have uncovered data that would not have emerged by using Grounded Theory. Thus, Grounded Theory could have influenced the data gleaned for this study; however, the evidence supported using this data analysis method for this specific research design. Finally, potential researcher bias existed in the process of data coding. This bias was addressed by the use of an external coder and kappa statistics. However, the external coder may have also had contributed bias to the study.

The external coder had potential to bias one of the measures of reliability for this study. Coding training for the coder and researcher took place under the guidance of the same faculty member over a period of one year. Due to this common training background, the results of the kappa statistic calculations may have been skewed higher than if the chosen external coder did
not have the shared training experience. However, a factor that assisted in minimizing this bias was that the external coder was from another field outside of physical therapy.

There were several opportunities for the participants to bias the study. It is notable that participants commonly want to do well and may erroneously respond in a way to favor the researcher and not share what they actually think (Mertens, 2010). This type of bias was possible due to a majority of the participating CIs being familiar with our program prior to volunteering to be a part of the study. However, the CIs were encouraged to share their thoughts accurately and repeatedly. Due to the positive and constructive data gathered, it appeared that the CIs were open to conveying truthful responses. Less experienced CIs also may have felt threatened by other CIs with more experience or education. Limiting the interaction to typed responses helped to minimize this potential for influential bias. Lastly, several CIs in the study reported being overwhelmed due to having very full schedules during the course of the study. This may have led them to not give their full attention to each data instrument thus affecting the findings. To minimize this potential bias, CIs were given timeframes over several days to complete any given data instrument.

**Implications for Future Research**

The last several chapters alluded to the topics in this section. Implications for future research begin with the DPT students. In Chapter 6, a proposed question asked if a DPT student could assess the quality of their CI’s mentoring skill set just as the student is expected to assess their Professional Behaviors at the end of each clinical rotation. A study that would examine the students’ assessment of a CIs’ performances after a student completed of all of their clinical experiences may be insightful and more accurate. After completing all clinical experiences, the
student has a broader viewpoint which may enhance their ability to decipher which CIs provided a better mentoring experience over others.

Another area of potential research would be closer examination of immediacy of education in comparison to traditional face-to-face continuing education courses. Looking at which of these avenues of instruction provide the more effective training environment for what topics as well as what additional learning components need to be in place to meet the preferred objectives and goals would help guide instructional designers and educators.

Future research studies could examine interaction between CIs. Since the primary venue for the data collection instruments was a web-based environment, an area that was not a focus for this study was the interactions of CIs as it relates to computer-mediated communication. Did the CIs experience a connection between each other as they were progressing through the study together? Did it affect how they performed in the data collection tools? Similarly, the student interaction could be an additional consideration with the online connection with one another while on clinical rotation. Would peer interaction affect their performance in the study? Both the CIs and students interactions warrant more investigation.

These implications for future research build upon each other to lead to a discussion on generalizability. In order to bring greater power to this study, it needs to be reproduced on a larger scale. This could be accomplished by the study expanding to include multiple disciplines or multiple universities. If the study became interdisciplinary, application and significance of the model into other healthcare disciplines could be tested. If successful, the model could provide a template for clinical-mentor education. Additionally, if multiple PT programs were involved, the study could then be adapted to look closer at assessing the potential link between DPT student outcomes, CI performance, and CI education.
With respect to what the literature stated about further research, Morren, Gordon, and Sawyer (2008) indicated more research must occur to confirm if a link between training and better CI skills exists. Additionally, both Davis (2008) and Papadakis et al. (2004) implied more in-depth studies in the areas of effective teaching strategies and better evaluation tools are essential. Dieker (2009) focused particularly on teaching strategies and questions the potential of developing video-learning modules as a method that would be both successful in creating learning outcome tools and cost effective for faculty members. Guhde (2010) confirmed enhanced student outcomes with learning-based video cases. Weidner and Hennings (2005) had a clinical vantage point and called into question if newly established standards of clinical education practices were evidence-based. Finally, keeping with the EBP focus, Luke, et al (2009) proposed that there is minimal evidence to support substantiated best practices for clinical faculty who function in the dual role of mentor and clinician. The implications from this study, and the comments found in the literature are clear, continued research in this area is important for the development of effective and appropriate clinical education experiences.

**Summary**

The background for this study began with Vision 2020 where our professional organization, the APTA, foresaw the need to transform PT into a formal doctoring profession. In order to reach the goal of developing entry-level, autonomous, reflective practitioners, PT schools elevated the level of academic rigor and length of clinical experiences. This created a snowball effect where PT schools needed to deliver larger amounts of information to CIs more frequently and in a more timely manner. This led to a new reliance on the Internet where a gap began to develop, and then widen, between CI needs and evidence-based, best practices. Research studies found that online education courses lacked in number and clinical education
focus. Additional factors that contributed to the ever-widening gap included inconsistent CI knowledge of how to work with students who have professional behavior issues, supervision of doctorate level PT students, and lack of evidence-based, clinical instruction best practices.

Thus, the study’s purpose came from this identified gap in practice and extensive literature review. The CI demand for increased online resources that centered on clinical education contributed to the development of the online learning module. By using ALT, SRT, and constructivism as the combined theoretical framework for the module, the instructional design evoked motivation, critical thinking, self-directed learning, and reflection from each of the treatment group participants. The literature review revealed the need to research best practices in clinical education in order to find out how to facilitate enhanced CI mentoring and discover whether a link exists between enhanced CI mentoring and student outcomes. The findings of the study established that by taking the online module CIs perceived an improvement in the quality of mentoring in the clinic. Treatment group-CIs did not provide a superior rotation over the control group-CIs according to the DPT students. However, the students that had the treatment group-CIs did report the use of module-taught best practices in the mentoring they received. Lastly, the treatment group-CIs did maintain best practices with use of the module as a key resource after a nine-week inactive period. The derived model demonstrated how CIs could maintain best practices and stay in the outer layer through the intentional design of the educational experience.

**Composition of the Bridge**

The undefined bridge over the clinical education gap was introduced in Chapter 1. The left wall consisted of the challenges that exist in clinical education including CI location, linking education to student outcomes, student behavior and supervision, and lack of evidence-based CI
Figure 7.1 The Bridge

**Figure 7.1** Definition of the bridge as a result of completing the study.

practices. The right wall was composed of the goals for clinical education such as enhanced student outcomes, defined student supervision needs, and evidence-based CI education best practices. At that point, the composition of the bridge was unknown. Now that the study has concluded, the bridge now has definable components. While not generalizable to a greater population due to the limitations stated earlier, the results of the study indicated that the major component of the bridge is the online learning module with the prerequisite learning environment of immediacy in education, reflection, and clinical practice.

In conclusion, this design-based research study revealed a relationship between education, designed artifact, and enhanced clinical practice. Thus, the study provided a foundation for further development of the clinical education bridge and the best practices model. By continuing the examination of these two entities, physical therapy clinical education will move towards achieving evidence-based, CI best practices and optimal student outcomes.
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doi:10.1016/j.iheduc.2006.10.005
Appendices

Appendix A  Pre-Test
Appendix B  Immediate Post-Test
Appendix C  Delayed Post-Test
Appendix D  Focus Group Interview Guide
Appendix E  Student Confidential Form
Appendix F  Follow-up Worksheet
Appendix A Pre-Test

Instructions: The primary purpose of this pre-test is to establish a baseline of your current knowledge and will not be used in assigning a grade for the learning module. Since it is a baseline assessment tool, not knowing an answer is expected.

1. Please review the following statements and rate the level of guidance you may or may not need in order to perform the activity. Consider how many different sources you may need to consult i.e. another therapist, supervisor, ACCE/DCE, handbook, or Internet.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Able to perform with consistent guidance</th>
<th>Able to perform with moderate guidance (two sources)</th>
<th>Able to perform with minimal guidance (one source)</th>
<th>Able to perform without guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish the groundwork to insure a successful clinical rotation</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>2. Work through a significant issue that arises in clinic with a DPT student</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>3. Strategies on how to use active listening to facilitate conflict resolution</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>4. How to work with Professional Behaviors/Generic Abilities (May, et al., 2010) to facilitate improvements in student behavior</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>5. If a student does not incorporate feedback that I give them, I know that I will take the following steps:</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
6. By not addressing an issue with a student, the following consequences may happen:

7. What are the main components of a Professional Behaviors Plan?

8. The below is an example of a Professional Behaviors Plan. What are three items that you feel are missing?

<table>
<thead>
<tr>
<th>Generic Abilities Self-Assessment</th>
<th>Name</th>
<th>Ima Student</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Behavior</td>
<td>Example</td>
<td>Plan for Development</td>
</tr>
<tr>
<td>1. Commitment to Learning</td>
<td>B</td>
<td>When I am in the clinic, I have not utilized my downtime as my CI would like. I often talk on the phone or check emails as I am trying to keep up with assignments from school or setting up plans for after I get off. I also have not been prepared for clinic by not looking up patient diagnoses for the next day. This has mostly been due to the above reasons. I feel that communication with my CI hasn’t been the best in regards to explaining myself.</td>
</tr>
<tr>
<td>Comments:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifies own learning needs based on previous experience.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welcomes and/or seeks new learning opportunities.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. When an issue has been addressed with a student and a plan has been implemented, what are at least two necessary steps to insure a successful outcome?

Now that we’ve got a baseline. Hope you enjoy the module and see where it can help you enhance your “best practices” with the clinical experiences you provide to your students.
Appendix B Immediate Post-Test

1. If a student does not incorporate feedback that I give them, I know that I will take the following steps:

2. By not addressing an issue with a student, the following consequences may happen:

3. What are the main components of a Professional Behaviors Plan?

4. The below is an example of a Professional Behaviors Plan. What are three items that you feel are missing?

<table>
<thead>
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<th>Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Professional Behavior</td>
<td>Example</td>
<td>Plan for Development</td>
</tr>
<tr>
<td>1. Commitment to Learning B</td>
<td>When I am in the clinic, I have not utilized my downtime as my CI would like. I often talk on the phone or check emails as I am trying to keep up with assignments from school or setting up plans for after I get off.</td>
<td>I will bring books to clinic that apply to the patients that I am seeing.</td>
</tr>
<tr>
<td>Comments: Identifies own learning needs based on previous experience.</td>
<td>I also have not been prepared for clinic by not looking up patient diagnoses for the next day. This has mostly been due to the above reasons.</td>
<td>I will look up patient diagnoses that I am not familiar with</td>
</tr>
<tr>
<td>Welcomes and/or seeks new learning opportunities.</td>
<td>I feel that communication with my CI hasn’t been the best in regards to explaining myself.</td>
<td></td>
</tr>
</tbody>
</table>

5. When an issue has been addressed with a student and a plan has been implemented, what are at least two necessary steps to insure a successful outcome?

6. Please list at least two ways in which you plan to implement what you’ve learned today into your clinical education “best practices” toolbox tomorrow?
Appendix C Delayed Post-Test

1. Please review the following statements and rate the level of guidance you may or may not need in order to perform the activity. Consider how many different sources you may need to consult i.e. another therapist, supervisor, ACCE/DCE, handbook, or Internet.

<table>
<thead>
<tr>
<th></th>
<th>Able to perform with consistent guidance</th>
<th>Able to perform with moderate guidance (two sources)</th>
<th>Able to perform with minimal guidance (one source)</th>
<th>Able to perform without guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Establish the groundwork to</td>
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<tr>
<td>insure a successful clinical</td>
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<tr>
<td>rotation</td>
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<td>2. Work through a significant</td>
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<tr>
<td>issue that arises in clinic with</td>
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<tr>
<td>a DPT student</td>
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<td>3. Utilize strategies on how to</td>
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<tr>
<td>use active listening to facilitate</td>
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<tr>
<td>conflict resolution</td>
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<td>4. How to work with Professional</td>
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<tr>
<td>Behaviors/Generic Abilities</td>
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<tr>
<td>(May, et al., 2010) to facilitate</td>
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<td></td>
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<tr>
<td>improvements in student behavior</td>
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</table>

Remembering the objectives from the learning module:

*To establish the groundwork for successful clinical experiences* through thorough orientations including ground rules (e.g. parking, dress, hours), when/where meetings will occur, tour of facility and how feedback will be given

*To identify interventions which will help prevent or remediate adverse situations* e.g. active listening, validation of feedback, holding regular meetings, etc.
To increase awareness of the Professional Behaviors and their implementation, these would only come into play if a student had a significant issue in clinic e.g. safety, consistent tardiness, lack of commitment to learning

To identify active listening and confrontational skills

Based on the learning module, please describe altered CI practices, if any, you used in this rotation that you will continue to use in future student rotations?

1. ____________________________________________________________
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4. ____________________________________________________________
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Appendix D Focus Group – Interview Guide

Research Question:
In what ways will CIs find a web-based learning module effective in learning best practices?

Interview Introduction:
Thank you very much for your commitment to clinical education and participating in this research study. I am very interested in what you have to say. Please note that it is okay to choose not to answer any of the questions asked. As a reminder, this interview will be recorded and data will be analyzed. Upon its conclusion, the transcript will be downloaded and placed onto a CD. This CD will be kept in a locked cabinet in a locked office so that no other individual will have access to it. Please be respectful of other participants by not discussing the content or remarks made during this focus group to other people.

Knowing that technical glitches may occur, if you experience any issue at all over the next 40 minutes, please either email me at chalee.engelhard@uc.edu or call me at (859) 240-8501 and I will help you get reconnected.

Some basic information and ground rules for the focus group include the following. The purpose of this study is to investigate the usability and content of a web-based learning module. The session will begin with an icebreaker question and run for no more than 40 minutes. Please know that there are not any “right or wrong” answers, each person’s opinion is valued. It will be important for each individual to have the opportunity to express his or her idea one at a time. If several people begin to share their ideas all at once, I will ask for a time out so that the original person is able to complete their thought.

Interview Questions

<table>
<thead>
<tr>
<th>Let’s begin by having each member share their name, how many years they’ve been involved in clinical education, and one interesting background item of interest for the group.</th>
</tr>
</thead>
</table>
| Do you feel you are more capable of working with challenging students than prior to taking the module?  
  Probe: How so or why not? |
| Remembering the objectives from the module –  
  **To establish the groundwork for successful clinical experiences** through thorough orientations including ground rules (e.g. parking, dress, hours), when/where meetings will occur, tour of facility and how feedback will be given |
To identify interventions which will help prevent or remediate adverse situations e.g. active listening, validation of feedback, holding regular meetings, etc.

To increase awareness of the Professional Behaviors and their implementation, these would only come into play if a student had a significant issue in clinic e.g. safety, consistent tardiness, lack of commitment to learning

To identify active listening and confrontational skills

Was the module effective in teaching best practices for CIs who mentor DPT students in the clinic?

Was the module effective in improving the quality of mentoring of DPT students in the clinic?

Probe: How so or why not? How many times did you go back to the module during the 9-week clinical rotation?

Based on the learning module, please describe altered CI practices, if any, you used in this rotation that you will continue to use in future student rotations?

This refers to new practices or altered approaches to old practices you learned that are beyond what you have done in the past

What would help a CI display best practices ongoing in their practice as a mentor to DPT students?

Are there any points of discussion about the module that you would like to address that we haven’t touched on, yet?

Probe: Do you feel you will be more effective in the clinic when working with DPT students due to taking the learning module? Features of the module? Future topics?

Now that our time remaining is coming to an end, I would like to give each person an opportunity to share a closing statement on the topics we have covered in this session.

Is there anything else you would like to share with me?

Probe: If you feel that there wasn’t enough time to express all that you wanted to, you are welcome to send me a follow up email today to complete your thought.

Thank you so much for your time. Your contribution to clinical education is very much appreciated. Please note that there is one final step in the study. I will be contacting you in 9 weeks which will be mid-May to complete the follow up worksheet. If you have any questions please don’t hesitate to contact me. Have a nice evening.
Appendix E Student Confidentiality Form

4. How often did your CI give you feedback on your performance during your clinical rotation?

<table>
<thead>
<tr>
<th>Daily</th>
<th>2-3 times a week</th>
<th>Once a week</th>
<th>Never</th>
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</table>

Verbal  

Written

5. Please check the appropriate response:

<table>
<thead>
<tr>
<th>Student Response to CI Mentorship</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>N/A</th>
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</thead>
<tbody>
<tr>
<td>a. My orientation adequately covered the ground rules for clinic including:</td>
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<td>1. Parking hours</td>
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<tr>
<td>2. Appropriate dress</td>
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<td>3. Clinic hours</td>
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<td>4. Tour of facility</td>
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<td>5. Introductions to other staff members</td>
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<td>6. Other:</td>
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<tr>
<td>b. My CI’s feedback empowered me to decide how to integrate their feedback into my daily practice</td>
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<tr>
<td>c. There was an appropriate balance of positive and negative feedback</td>
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</tbody>
</table>
### d. My CI was an active listener as evidenced by eye contact, validation of clear communication, asked questions to clarify understanding, and/or appropriate non-verbal

### e. My CI provided a clinical environment that was conducive to continuous development of my Professional Behaviors

### f. The communication between my CI and me helped achieve my clinical rotation goals

---

6. Describe, if any, behaviors your CI exhibited that you feel facilitated your growth to become an entry level physical therapist:

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

7. Describe, if appropriate, the level of effectiveness your CI demonstrated in providing a sound learning environment for you as a DPT student:

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Additional Comments:

____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

Signed: ____________________________________________________________________________

Date: __________________________
Appendix F Follow Up Worksheet

2. You are notified by your CCCE that you will be getting a student, Ima Stresst, starting in two weeks. Please list activities you would do in order to set up a DPT student clinical rotation for success. Please note that you are welcome to document items you would do both prior to and during the rotation.  

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________

3. Considering the above question, what percentage of the below resources did you draw on to formulate your answer? Please type in a number in each of the below text boxes. Please be sure that all four of the below numbers add up to 100.

(0% to 100%) Personal Experience
(0% to 100%) Another therapist/supervisor/DCE/ACCE
(0% to 100%) Online Learning Module
(0% to 100%) Other continuing education courses

4. Your student, Ima, has arrived and is off to a slow start. In the first two weeks, the student has been late to clinic three times and has had difficulty establishing rapport with other PTs in the clinic as well as your patients.

Since Ima is not doing well in clinic, what would you do to help facilitate getting her back on track?

____________________________________________________________________________
____________________________________________________________________________

5. Considering the above question, what percentage of the below resources did you draw on to formulate your answer? Please type in a number in each of the below text boxes. Please be sure that all four of the below numbers add up to 100.

(0% to 100%) Personal Experience
(0% to 100%) Another therapist/supervisor/DCE/ACCE
*6. After your attempts to educate Ima have not helped, she continues to be late to clinic and now you are receiving complaints from patients and fellow therapists. You have decided to put her on a Professional Behaviors plan, how would you go about putting her on a plan?

______________________________________________________________________________
______________________________________________________________________________

*7. Considering the above question, what percentage of the below resources did you draw on to formulate your answer? Please type in a number in each of the below text boxes. Please be sure that all four of the below numbers add up to 100.

(0% to 100%) Personal Experience

(0% to 100%) Another therapist/supervisor/DCE/ACCE

(0% to 100%) Online Learning Module

(0% to 100%) Other continuing education courses

*8. It is now time to meet with Ima to review her Professional Behaviors plan. Please identify ways you can demonstrate active listening strategies to help facilitate successful outcomes when confronting her.

______________________________________________________________________________
______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

*9. Considering the above question, what percentage of the below resources did you draw on to formulate your answer? Please type in a number in each of the below text boxes. Please be sure that all four of the below numbers add up to 100.

(0% to 100%) Personal Experience

(0% to 100%) Another therapist/supervisor/DCE/ACCE
*10. Are there any other points you would like to share about incorporation of the best practices you would do to help Ima have a successful outcome to her clinical rotation?
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

*11. Considering the above question, what percentage of the below resources did you draw on to formulate your answer? Please type in a number in each of the below text boxes. Please be sure that all four of the below numbers add up to 100.

(0% to 100%) Personal Experience
(0% to 100%) Another therapist/supervisor/DCE/ACCE
(0% to 100%) Online Learning Module
(0% to 100%) Other continuing education courses

*12. Please rate at what level of effectiveness in the clinic you will have when mentoring physical therapy students due to taking the online learning module.

○ No change in level of effectiveness
○ Minimally more effective
○ Moderately more effective
○ Extremely more effective
○ Other (please specify)