Summer 2013

The Relationship between Athletic Training Students Critical Thinking Skills and Clinical Instructor Supervision: A Pilot Study

Michele Renee Kabay

THE RELATIONSHIP BETWEEN ATHLETIC TRAINING STUDENT CRITICAL THINKING SKILLS AND CLINICAL INSTRUCTOR SUPERVISION: A PILOT STUDY

A Dissertation

Submitted to the John G. Rangos, Sr. School of Health Sciences

Duquesne University

In partial fulfillment of the requirements for

the degree of Doctor of Philosophy

by

Michele R. Kabay

August 2013

THE RELATIONSHIP BETWEEN ATHLETIC TRAINING STUDENT CRITICAL THINKING SKILLS AND CLINICAL INSTRUCTOR SUPERVISION: A PILOT STUDY

By

Michele R. Kabay

Approved June 27, 2013

_____ Paula Sammarone Turocy, EdD, LAT, ATC Associate Professor of Athletic Training (Committee Chair)	_____ Leesa DiBartola, EdD, PT, CHES Assistant Professor of Physical Therapy (Committee Member)
_____ Gregory H. Frazer, PhD Dean and Professor Rangos School of Health Sciences (Committee Member)	_____ Christopher R. Carcia, PhD, PT, SCS, OCS Program Director Chair & Associate Proffessor, Dept of Physical Therapy, Rangos School of Health Sciences

ABSTRACT

THE RELATIONSHIP BETWEEN ATHLETIC TRAINING STUDENT CRITICAL THINKING SKILLS AND CLINICAL INSTRUCTOR SUPERVISION: A PILOT STUDY

By

Michele R. Kabay

August 2013

Dissertation supervised by Paula Sammarone Turocy, EdD

The purpose of this study was to 1) assess the critical thinking skill level of the athletic training student at onset and end of the clinical education experience 2) to examine the influence of the students' critical thinking skills and the CIs' supervision responses to the changes in the students' critical thinking skills and 3) to compare the students' and the clinical instructors' perceptions of the CIs' supervision responses to the athletic training students' critical thinking skill levels.

Methods: A descriptive research study design was used. To explore the critical thinking skill levels of the athletic training students (ATSs), the California Critical Thinking Skills Test (CCTST) was used. Perceived clinical supervision responses of the Clinical Instructors (CIs) to the ATSs' level of thinking were analyzed using two tools developed for this study-ATS Perception of Clinical Instructor Supervision Response (S-PS) and the

CI Self-Evaluation of Supervision Response (CI-S) assessments. The S-PS and CI-S were assessed for validity and reliability. Data were collected at the beginning and at the end of the students' clinical education experiences. A sample of convience was used from the CAATE approved programs in the state of Pennsylvania. 121 students from eight participating institutions chose to participate in the study. The CIs of each participating student were solicitated to participate in the study. 23 CIs completed and returned the suvey at the beginning and at the end of the students' clinical education expeiences. Correlations and paired t-tests were used to analyze the data.

Results: The students demonstrated an overall moderate critical thinking skill level. Although there was a decrease in the overall CCTST score over time, the score did not fall below the moderate critical thinking level. There was no statistically significant difference between the critical thinking skill levels of the students who had completed 3 or more years of higher education and the students who completed 1-2 years of higher education.

The athletic training students perceived a statistically significant change in the CIs' supervision responses over the period of one clinical education experience. The ATSs perceived an increase in the amount of autonomy given to the ATSs by the CIs during their clinical education experiences, as well as increases in their own motivation and self-awareness occurring during those clinical education experiences. The data reflected no statistically significant changes in the CIs' self-perception of their supervision responses to the students' levels of critical thinking over time. The CIs did perceive that they gave the students greater amounts of autonomy in the clinical experiences, as well as provided

higher levels of motivation and encouraged greater self-awareness in the students than what the students perceived occurred.

Conclusion: Clinical education for students in this sample may not be structured in the most effective way to encourage development of the students' critical thinking skills. This sample demonstrated little improvement in CTS and exemplified the need for better ways to develop of higher levels of critical thinking during their entry-level athletic training preparation. One way this concern may be addressed is that during clinical education experiences, the CIs could adapt their supervision responses to better challenge students and force them to integrate critical thinking skills more often and at higher levels into their decision making processes to advance to higher levels of thinking over time. An improvement in the type of reflection by the students, combined with more frequent and critical evaluation and feedback to the students during clinical education experiences may improve the students' levels of thinking. A more active role of the clinical education coordinator in clinical education of the students also may assist in improving the students' levels of critical thinking

DEDICATION

Dedicated to the many athletic training students and clinical instructors who have impacted my career and helped me to realize the importance of clinical education and the supervision that occurs for our students. And also to the athletic training students who will benefit from the research that I do.

ACKNOWLEDGEMENT

There have been many people who have supported me during my years of perseverance to compete this degree. I have to first thank and acknowledge my wonderful family for their never ending support, especially my husband Michael for his motivation, encouragement and love, as well as my boys who grew into wonderful young men while I pursued my PhD and put up with my research papers all over the house and to my Mom, Dad, Curtis and Uncle Bert who always supported me through my education and career.

I could not have completed this process without the wonderful guidance and encouragement from my mentor, committee chairperson and friend Dr. Paula Sammarone Turocy. I also want to thank and acknowledge my dissertation committee and mentors, Lessa DiBartola, EdD and Gregory Frazer, PhD. I learned so much from my committee and professors over the years, I am honored to now be a graduate from this program.

A special thank you to the following people for their continued support: Donna, Mark and Scott, my colleagues and athletic training staff from Waynesburg University especially Dr. James Bush - I'm so glad he loves statistics and Dominique Mason - you were such a great help and so supportive, I couldn't have done this without you. Waynesburg University administration for their support, especially Dr. AJ Anglin, Dr. Robert Graham and Dr. Chris Cink. To my students who were so helpful and supportive during this process, especially Caren, Jenna, Ben, Krystal, Katie, and Alan. I would also like to thank the library staff for the many inter-library loans they found for me.

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER 1: Introduction

Critical thinking skills are vital for a person to become a successful, lifelong learner and grow as a professional. This is particularly true for health care professionals, including athletic trainers, who are confronted daily with multiple complex problems that require critical thinking skills.[1] Since situations that an athletic trainer experiences will not follow the "textbook" example, and different injuries can exhibit similar signs and symptoms, critical thinking skills are necessary for the athletic trainer to consider all of the possible evaluation, management and treatment options that may be indicated.[2,3] Critical thinking abilities allow the athletic trainer to comprehend, apply, analyze, and synthesize information attained from a situation and determine the best action for that specific situation.[4] Understanding the importance of critical thinking skills for the athletic trainer confirms that it is imperative that entry level athletic trainers develop critical thinking skills during their education. One of the goals of athletic training (AT) education is for the athletic training student (ATS) to develop critical thinking skills[5,6] that prepare the student to excel in both the academic and clinical setting to allow the application to apply knowledge and skills to new and emergent situations.

Clinical education is when the application of knowledge and skills, learned in classroom and laboratory settings, are performed on patients under the supervision of an approved clinical instructor (ACI) or clinical instructor (CI).[7] It is believed that clinical education helps the student to develop critical thinking skills, clinical decision-making skills, and a sense of professional socialization.[8] Clinical education is designed to facilitate the transition from simply doing a skill correctly as directed by an instructor, to incorporating the skill correctly and in a manner appropriate to the situation presented in the clinical environment. Skill mastery and integration based upon sound critical

thinking, problem solving and clinical decision-making should be encouraged during clinical education experiences.[9,10] This encouragement is provided to a student during field (clinical) experiences under the supervision and education of a practicing clinician (clinical instructor).[11]

Defining terminology in the context of athletic training education and supervision is paramount to the understanding of the problem and purpose of this research. The following terms and definitions are those important to review before further discussion.

Table 1.1 Operational Definitions

Able to Intervene	The CI or ACI is in the immediate physical vicinity and interact with the ATS on a regular and consistent basis in order to provide direction and correct any inappropriate actions. The same as being physically present.[7]
Active Clinical Education	When an ATS is directly supervised by a CI during actual practice on patients of knowledge and skills learned in classroom and laboratory settings.
Approved Clinical Instructor (ACI)	An appropriately credentialed professional identified and trained by the ATEP clinical instructor educator to provide instruction and evaluation of the Athletic Training Educational Competencies and/or Clinical Proficiencies.[7]
Athletic Training Education Program (ATEP)	Entry-level athletic training education program that is accredited by the CAATE.
Athletic Training Student (ATS)	Student enrolled in an entry-level ATEP majoring in athletic training and actively involved in clinical education.
Autonomy	Level of dependency on supervisor. A student with high autonomy knows when to seek consultation from the supervisor.[12]
Clinical Education	The application of knowledge and skills, learned in classroom and laboratory settings, to actual practice on patients under the supervision of an ACI/CI.[7]
Clinical Decision Making	Process by which a clinician collects cues, processes the information, comes to an understanding of a patient problem, plans and implements interventions, evaluates outcomes and reflects on and learns from the process.[13]Dependent upon critical thinking.[14]
Clinical Experiences	Those clinical education experiences for the ATS that involve patient care and the application of athletic training skills under the supervision of a qualified instructor.[7]

Clinical Instructor (CI)	A credentialed health care provider for a minimum of one year. If credentialed for less than one year, a planned supervision policy of that CI by an experienced credentialed CI that insures the quality of instruction for the ATS must be in place. The primary responsibility of the CI is to supervise the ATS during clinical and/or field experience. At least 75% of the ATS clinical experiences must occur under the direct supervision of an ACI or CI who is an ATC®[7]As of 2013, CAATE replaced the term clinical instructor with the term Preceptor. For this study, CI was continued to be used through the final study.
Clinical Integrated Proficiencies (CIP)	Represent the synthesis and integration of knowledge, skills, and clinical decision-making into actual client/patient care. In most cases, assessment of the CIPs should occur when the student is engaged in real client/patient care and may be necessarily assessed over multiple interactions with the same client/patient.[15] (Appendix A)
Commission of Accreditation on Athletic Training Education (CAATE)	National agency for accrediting entry-level athletic training education programs. Develops, maintains, and promotes appropriate minimum standards of quality of entry level athletic training education programs.
Critical Thinking	Purposeful, evaluative, and reflective thinking that explicitly aims at well-founded judgment, in an attempt to determine the true worth, merit, or value of something. [16]
Critical Thinking Skills	Cognitive skills of critical thinking that include interpretation, analysis, evaluation, inference, explanation, and self-regulation.[16]
California Critical Thinking Skills Test (CCTST)	Standardized instrument that measures overall critical thinking as defined by the APA Delphi research study.[17]
Direct Supervision	Supervision of the ATS during clinical experience. The ACI or CI must be physically present and have the ability to intervene on behalf of the athletic training student and patient.[7]
Integrated Developmental Model of Supervision (IDM)	Guide for supervision in assessing needs of students with an emphasis in development and the need for the supervision process to develop with the student. Supervision should generally decrease in the amount of structure provided by the supervisor as the student develops.[18](Appendix B)
Motivation	A person's level of confidence, confusion, despair, anxiety during skill selection and professional identity. A student with high motivation is stable s doubts remain, but the doubts are not disabling. An emphasis on total professional identity is the focus.[12]
Problem Solving	A primarily linear process of thinking that uses five steps; presentation of a problem, definition of a problem, development of a hypothesis, testing a hypothesis, and

	selection of the best hypothesis.[19]
Self-Awareness	The recognition of a person's strengths and weaknesses. A student with high self-awareness understands his/her own strengths and weaknesses. [12]
Supervised Autonomy	Direct supervision while mentoring the student to foster the independent, but guided, application of clinical proficiencies and critical thinking skills to match the individual student's level of clinical competency.[9]
Supervision Response	Actions of a CI in response to the student's stage of learning demonstrated by the students autonomy, motivation and self-awareness as described in the IDM.

Central to the clinical education experience is the need to provide experiential learning opportunities that prepare the student as a competent practitioner.[13,20,21];,[22,23]In the past, an ATS was expected to learn through simple observation of and discussion with a clinical instructor.[24] Clinical education for entry-level athletic trainer education has evolved from lengthy internships of 800-1500 hours over a minimum of two years with only a minimum patient contact hour requirement, to today's model that requires no specific number of contact hours in a minimum of two years where students must demonstrate competence in specific clinical proficiencies. The current requirement includes learning and performing clinical skills in the classroom laboratory, to demonstrate those skills in clinically integrated situations (Clinical Integrated Proficiencies-CIP). Current clinical education involves more than observation by the student and passive supervision from the CI. To develop sound critical thinking skills, a student must be actively engaged with and experience the content of practice.[25-28] This engagement and experience is a primary component of the learning process known as experiential learning.

The change in the focus on clinical proficiencies is not debated. Other clinical education models in allied health and medicine have moved to a proficiency-

based clinical education models. The debate here focuses on the type of supervision that is taking place during the clinical education of the ATS.

The evolution of athletic training clinical education has mirrored that of other health professions as the clinical education and curricular content requirements for athletic training entry-level education have evolved. The role and responsibilities of the clinical instructor also has evolved with the interpretation of "direct supervision" of the ATS requirement. While direct supervision of the athletic training student during clinical education has been a consistent requirement for clinical education since the early 1970's when the athletic training certification became available by the Board of Certification (BOC), how the practice was implemented varied greatly. The current definition from the Commission on Accreditation of Athletic Training Education (CAATE) clarifies that practice today; the Clinical Instructor (CI) must be physically present and have the ability to intervene on behalf of the athletic training student and the patient. [7] The CAATE updated this definition in 2007, encouraging graded autonomy and independent actions by the ATS. [29] While direct supervision is defined and recommendations for how the CI should provide autonomous practice experiences during clinical education have more recently been discussed,[3,9,30-33] the direct supervision requirement is the only CAATE-specific clinical education requirement for CIs.

Although there are diverse models of clinical supervision used in allied health and medical education, no one specific model is required or recommended by the CAATE. Based upon the desired outcomes of CAATE-accredited educational programs for clinical education experiences, the requirement of direct supervision and the encouragement of graded autonomy and independent actions by the ATS,[29] is becoming the preferred model

of supervision. While the Integrated Developmental Model of Supervision (IDM) was originally developed for the clinical training of psychologists,[12,18] it also can describe the necessary/desired outcomes reflected in the goals of clinical education expected by the AT profession. The IDM describes the development of students through stages of learning and provides the expected supervisor responses to the students based upon learning level.[12] The IDM identifies expected changes in students clinical behaviors in three criterion structures as the student moves through levels of learning. These structures are motivation, dependency-autonomy and self/other awareness. [12]

The foundation of the IDM describes the development of students through stages of learning reflects Kolb's Experiential Learning Theory.[20] The stages of learning in the experiential learning cycle involves a continuous process that repeats as new learning is introduced. The effectiveness of this type of learning relies on the ability of the individual to move between the stages of learning to solve problems. Similarly to Kolb's experiential learning cycle, the development of students through the stages of learning and development of higher levels of clinical practice and critical thinking in the IDM takes into consideration that while a student may exhibit advanced clinical behaviors in one instance or with one set of skills, that same student may not demonstrate the same level of clinical competence in another area of clinical behavior. A student may not demonstrate the same level of competence in all the domains of clinical practice.[12] A student may be an advanced learner and proficient in first aid and emergency care procedures while simultaneously be a beginning learner in therapeutic exercise and rehabilitation. If a CI considers every student to be at the same learning level and does not adjust his/her response in supervision to the level of the student, the CI is less likely

to encourage autonomy, self and other awareness, and motivation. The result may be that the student may not have the optimal opportunity to develop these skills that lead to critical thinking, confidence and autonomy.[12]

Statement of the Problem

Although the literature reflects agreement that clinical education is paramount to the success of the entry-level athletic trainer, there is much debate within the profession about the requirements for supervision of clinical education. Much of this debate centers on the changes that have occurred with the implementation of clinical education requirements for the entry-level athletic trainer.

While it is believed that the graduates of Athletic Training Education Programs (ATEPs) today have greater knowledge and skill than students of a decade ago, it is also believed that they do not demonstrate sufficient critical thinking skills, nor the ability to apply skills with confidence at as high of a level as did past graduates. It has been theorized that the emphasis on the requirement for direct supervision during clinical education has negatively impacted the ability of students to meet one of the primary goals of clinical learning - the development of critical thinking abilities and confidence in clinical decisions - during clinical experiences.[34,35] The most pervasive theory for the lack of critical thinking and confidence is that direct supervision results in a learning barrier that prevents the ATS from developing sufficient clinical reasoning and critical thinking skills to become competent and skilled athletic training professional.[20,30,36]

There has been much discussion and debate about the need to enhance and possibly restructure clinical education experiences to enhance student opportunities to think critically,[13,30,31,37-40] solve clinical problems,[8,13,21,41] and make confident

decisions.[42,43] Although observations have been made and concerns about the outcomes of clinical education have been expressed, examination of the causes of the concerns for how and if the direct supervision emphasis has negatively impacted the ATS ability to critically think and has decreased student confidence in his/her clinical decision making skills has not yet occurred. Without identifying the reasons why entry-level athletic trainers appear to have decreased critical thinking skills and demonstrate a lack of confidence in clinical skills, recommendations for solutions to the problems are baseless. To make informed recommendations for how the student should be supervised by the CI during clinical education, further examination of the current supervision by the CI in response to the ATS level of critical thinking needs.

How information about supervision level, skills, characteristics and goals during clinical education experiences is being disseminated to the CI is unknown. How supervision is being evaluated is unknown. The only CAATE requirement for how clinical education is conducted is for direct supervision how a CI should supervise a student during the clinical education experience. An AT CI who went through a National Athletic Trainers' Association (NATA)-approved AT education programs prior to 1983 was required to obtain a teaching certificate as part of his/her AT education.[44-46]This expectation required AT students, at the time, to take courses in education, learning theories, and having teaching experience. Since 1980, AT graduates of entry-level programs do not have these educational requirements; many of the CIs who supervise the ATSs have no background in education, learning theories or supervision beyond the minimum amounts required to be included in ACI training courses.

A discovery of the supervision responses of the current CIs will be essential to making correct/appropriate recommendations as to how to modify clinical education to produce more professional who have developed high levels of critical thinking skills, motivated and have increased confidence with autonomy.

Purpose of the Study

To date, there is limited research examining the type of supervision the CI provides the ATS during clinical education, and there is no research in athletic training on the impact that supervision level has on student learning and preparation/readiness to enter the profession. The purposes of this study are:

1. To assess the critical thinking skill level of the athletic training student at onset and end of the clinical education experience.
2. To examine the influence of student critical thinking skills and the CIs supervision response to the development of the student's critical thinking skills.
3. To compare the student and clinical instructor perceptions of the CI supervision response to the ATS critical thinking skill level.

Research Questions, Hypothesis and Variables

An evaluation of the ATS critical thinking skills and the response of the CIs supervision level to the student's critical thinking skill level will be examined through this study. The research questions are:

Research Question 1

What are the critical thinking skill levels of the ATSs, and how do they change during the clinical education experience?

Hypothesis 1: There will be a change in the critical thinking skill level of the ATS over time (traditional fall clinical education experience).

Independent Variable: ATS critical thinking skills.

Dependent Variable: ATS critical thinking skill performance on the CCTST.

Research Question 2

Is there a relationship between the CIs' self-perception of their supervision responses and the ATSs' perceptions of the CI supervision responses?

Hypothesis 2: The CIs and the ATSs will perceive the characteristics of the CIs supervision responses in a consistent manner with the ATSs' levesl of critical thinking skills.

Independent Variable: CI self-perception of supervision response.

Dependent Variable: ATS perception of the CI supervision response.

Research Question 3

Are the CI supervision responses consistent with the ATSs' critical thinking skill levels and are the critical thinking skill levels consistent with the CIs' supervision responses?

Hypothesis 3: The critical thinking skill levels of the ATS and the level of the CIs supervision responses are consistent with each other.

Independent Variable: ATS critical thinking skills.

Dependent Variable 1: CIs self-perception of supervision response.

Dependent Variable 2: ATS perception of the CIs supervision response to the student's critical thinking skills.

Research Question 4

Is there a relationship between the change of the ATSs' and CIs' perceptions of the CIs' supervision responses and the changes in the ATSs' critical thinking skill levels?

Hypothesis 4a: The changes in the CIs' supervision responses between onset and end of clinical education experiences will be consistent with the changes in the ATSs' critical thinking skill levels.

Hypothesis 4b: The changes in the ATSs' supervision responses between onset and end of clinical education experiences will be consistent with the changes in the ATSs' critical thinking skill levels.

Independent Variable: Changes of ATS critical thinking skills.

Dependent Variable 1: Change in CIs self-perception of supervision response.

Dependent Variable 2: Change in ATS perception of the CIs supervision response to the student's critical thinking skills.

The tools to collect the data are: the California Critical Thinking Skills Test (CCTST)[17] published by Insight Assessment to assess the students level of critical thinking skills, the CI Self-Evaluation of Supervision Response (CI-S), and the ATS Perception of CI Supervision Response (S-PS) to assess the CI supervision response. The CCTST is a standardized tool validated to assess critical thinking skills in the general population [17] The supervision assessment surveys were developed by the primary investigator and her dissertation chair using the criterion structures identified in the IDM supervision model (motivation, autonomy and self/other awareness) (Appendix B) and the required Clinical Integrated Proficiencies (CIPs) of AT education (Appendix A) for content themes. The participants for the research were solicited from a convenient sample of athletic training students and their supervising CIs from ATEP institutions in the Commonwealth of Pennsylvania. These instruments were be completed at the beginning and the end of the fall 2012 semester of active clinical education. The surveys

were distributed, collected and returned to a third party not involved directly with the project by the program director (PD) or his/her designee at each institution. The primary investigator remained blind to all data collected and to all indentifying variables while analyzing it. Data from the surveys were analyzed using correlations and t-tests at an alpha level set at $p<.05$.

Restatement of Problem

As the increase in knowledge and clinical skills for entry-level athletic trainers has evolved, there is perceived to be a decrease in the ability of these athletic trainers in critical thinking abilities and confidence in their clinical decision making skills. A primary theory of why this has occurred is that the direct supervision that the CI gives the ATS during clinical education results in a barrier preventing the ATS from developing these skills sufficiently. An examination of the CIs' supervision levels during clinical education has not been examined to date. The purpose of this study is to examine the critical thinking skill levels of the ATSs and the CIs' supervision responses to the ATSs' critical thinking skill levels.

The findings from this study will be used to inform the profession of athletic training of data to support or refute theories associated with the development of the critical thinking skills of the athletic training student sample compared to the critical thinking skills norms of four year college students determined from norms published by Insight Assessment. It also will help to inform whether there is a change in those critical thinking skill levels over a period of time(one fall clinical education experience). The findings also will be used to provide informed insight as to whether the supervision response of the CI during clinical education experience is consistent with the students' critical thinking skill levels. Recommendations for athletic training educators in

Pennsylvania to improve the quality of entry level athletic training education for this sample will be made to include recommendations for changes in CI supervision responses to the ATSs' critical thinking skill levels.

CHAPTER 2: Literature Review

Introduction

The profession of athletic training has evolved and the education for the entry-level athletic trainer also has evolved. This evolution has produced a process where students' struggle to combine textbook knowledge, laboratory experiences, and clinical skills throughout the education of an entry-level athletic trainer, with the ultimate goal of producing well-rounded practitioners who can think critically and act functionally as professionals. The knowledge required of athletic trainers is continually changing and increasing every year.[47] Denise Fandel, Administrator of Credentialing Programs and; current Executive Director of the Board of Certification (BOC) stated, "The body of knowledge certified athletic trainers have to keep up with is expanding so fast that it puts great demand on the professional to stay as current as possible while building a career that takes a lot of hours." (p 11)[48] This tremendous increase in the knowledge requirements, the continual changes in health care and new emerging practice settings challenge the athletic training professional to adapt to many new situations. To adapt to situations, athletic trainers must be able to critically think to apply their knowledge, skills, and to make sound clinical decisions.[49]

Concern that the entry-level athletic trainer does not have adequate decision making confidence, skills to critically think through problems, and/or necessary knowledge of clinical skills has come to the forefront of professional discussion and debate. [4,8,9,13,30,31,34,50,51] Through informal observation, commentary, and discussion with peers, it appears that employers are facing these types of challenges with recent graduates entering the job markets, yet there is minimal research to validate the impression that current employers and more experienced peers of entry-level athletic trainers that

students are inadequately prepared to enter the work force.[51] These concerns have led some to recommend changes in how the education for the entry-level athletic trainer occurs to include different teaching strategies and instructor resources,[33,52,53] clinical teaching strategies,[3,4,8,13] and supervision models.[32,33,50]

Various opinions have developed as to why entry-level practitioners appear to be ill-prepared today in comparison to the past. The most pervasive theory is that today's direct supervision of clinical education requirement creates a learning barrier that prevents students from developing crucial clinical reasoning and critical thinking skills they need to be competent and skilled professionals.[20,30,36] Editorials and other recommendations that focus on supervision of clinical education experiences have become more abundant over the past five years.[9,30,31,35,50,54] Scriber[30] stated as a result of direct supervision of all clinical experience students may become too isolated, and be required to observe rather than make independent clinical decisions, preventing them from being able to develop their own independent thinking and decision-making skills as a result of the direct supervision.[30] Contrary to often heard comments and discussions, the intent and requirement of direct supervision for the athletic training student has not significantly changed over the past 30 years.[9] A review of definitions of direct supervision in athletic training through time does reveal some evolutionary changes in the definition; however, the actual requirement has not changed in substance as many have elude.[7,9,55-57] The current definition of direct supervision of athletic training students in clinical education settings from the Commission on Accreditation of Athletic Training Education states that the ACI and/or CI must be physically present and have the ability to intervene on behalf of the athletic training student and the patient.[7] Although the latest

interpretation of direct supervision for the athletic training student encourages graded autonomy and independent actions by the athletic training student,[29] with the current definition it is not clear if or how the CI should provide autonomous practice situations/experiences for the athletic training student that would encourage students to develop the critical thinking skills and professional behaviors necessary to be successful entry-level professional.[30]

A clear understanding of the thinking process, critical thinking and its importance in athletic training and how the type of supervision during clinical education affects the students development of critical thinking, autonomy and self-awareness is an important step in addressing the concerns of the profession.

Defining Problem Solving, Clinical Decision Making, and Critical Thinking

Researchers may use the terms critical thinking, problem solving, clinical reasoning, and clinical decision making interchangeably, although there are differences between these terms. Kurfiss[58] categorized critical thinking as a form of problem solving. Studies have defined problem solving as a method of analyzing well-defined problems, whereas critical thinking has been defined as a method of evaluating more ambiguous problems.[58,59] Problem solving is a linear process of thinking using five steps: presentation of a problem, definition of a problem, development of a hypothesis, testing a hypothesis, and selection of the best hypothesis.[19,59,60] These steps have since been researched and altered for efficiency, but the existence of steps needed to solve a specific problem exist in very similar forms.[58,60] Research has found that problem-solving skills are not transferable from one content area to another, whereas knowledge that is acquired

with experiences over a period of time builds a basis for critical thinking abilities that can be transferred across content areas.[58,60,61]

Clinical reasoning is described as a process by which a clinician collects cues, processes the information, comes to an understanding of a patient problem, plans & implements interventions, evaluates outcomes, and reflects on and learns from the process.[13,62] The clinical reasoning process is dependent upon a critical thinking 'disposition'[14] and is influenced by a person's attitude, philosophical perspective and preconceptions.[63] Clinical reasoning is specific to how an expert clinician strings line a of inquiry and analysis together for patient management. This reasoning involves making multiple decisions based on dimensions of knowledge and skill sets, gathering of subjective and objective data, complex interactions with the patients, family members and other providers; and employs real time problem solving.[13,64] Levels of clinical reasoning differentiate the thinking process of novice from an expert clinician when confronting complex or novel clinical problems.[64,65] With experience, clinical reasoning becomes a more automatic response as a clinician moves from a novice to expert. Relevant medical knowledge and previous experience together play central roles in successful clinical problem-solving and decision making.[65]

Critical thinking has been related to clinical decision making and clinical judgment in health professional education and as a component to clinical reasoning.[66] In the clinical setting, critical thinking enables a clinician to arrive at sound and rational decisions to carry out patient care. The clinician must differentiate relevant data and analyze that data to identify clinical diagnoses. Critical thinking is reflected in the ability to critique relevant interventions, weigh the consequences of possible decisions, and

consider multiple perspectives to care. As care is provided, clinicians evaluate patient responses and the effectiveness of those management choice(s).[67] A clinician can follow a prescribed template, conduct an efficient and orderly evaluation, and arrive at a workable solution without ever thinking critically. This clinician is competent, but the barrier that keeps that clinician from becoming confident and proficient is the key critical thinking component of reflection. The master clinician follows the same template, analyzes the same data, and then compares with previous experience before forming a decision. The master clinician generates alternative theories or solutions to solve a particular problem, which distinguishes that experienced clinician from a less competent peer.[68]

The foundation of problem solving, clinical decision making, and critical thinking is the process of thinking and learning. That process has been examined for centuries and continues to be explored across many disciplines to address issues that arise as time progresses. When we can understand the foundation of the thinking and learning process, we can better understand how thinking and learning occurs during clinical education experiences for athletic training students.

The process of Thinking and Learning

Thinking is the basis for learning and the processing of new information.[61] For the process to begin, there must be a perception and recognition that new information is more than routine. Cognitive scientists have traditionally defined thinking as problem solving,[69]- a complex mental process that requires the modulation and control of skills to receive information from the senses,[69-71]comprehend it, then manipulate that information in the mind, applying logic and reasoning, to reference the new information in context

with previous learning or experiences,[69-72] in order to make sense of the new learning.[69,72,73] There must be an intentional search for connections between new information collected and data retrieved from past experiences. When these connections are made, relevant information is transformed and can be applied toward the resolution of the new problem.[69] Thinking is a skill, meaning that it is something that can be taught, learned and practiced in the course of teaching and learning.[73] "This implies that thinking is viewed as a process. Thinking skills are not content to be placed into the brain, "Rather, they are processes which, when practiced, empower the brain to work more efficiently."p3 [74]

There are theories as to how this learning and processing of information occurs. John Dewey (1859-1952) defined learning entirely in relation to experience. He believed that every experience an individual has affects his understanding of new experiences and the quality of those experiences.[61] This theory, later known as Experiential Learning Theory, describes the process of how understanding (learning) occurs as a result of the interaction between the learner and his understanding and processing of the experience. Dewey conceptualized that reflective thought was a mental process that originates with a state of doubt and, in an attempt to relieve that doubt, the learner searches for ways to ease that doubt by understanding new information. Thinking arose from a situation of ambiguity which caused dilemmas and required the consideration of alternatives. Resulting judgments or critical thoughts are developed to solve the doubt.[61,69] Formation of new ideas and the development of a rationale for those alternatives are tested actively by experimenting with or employing the new ideas in different situations .[61,75] It has been hypothesized that Dewey realized that as each new thought is developed, it must

continuously be reevaluated for its relevance and ability to be applied again in a new or different situation. [76]

Dewey's theory of learning describes how new learning occurs when a dilemma and uncertainty emerges, when a habit or routine way of thinking about a specific idea does not "fit" a new problem or situation , requiring a student to develop a new impulse or reason to think about that problem again. According to Dewey, every new situation requires study (observation) and the development of a hypothesis to determine viable alternatives to how the information was understood in the past (knowledge) before it can be managed and assessed for its ability to address a new situation (judgment).[19,61,77,78] An example of how Dewey's learning process occurs with the student would be when an athletic training student observes treatment of a wound (observation) by an experienced athletic trainer, then learns about general wound management in class (knowledge). A real-life clinical situation (stimuli) is later presented that the student may not be sure how to manage, but the student is able to identify how the situation compares to what he originally learned (judgment). As the student manages (action) the new situation using the knowledge he learned previously, he enters a higher level of learning as he demonstrates wound management.

Expanding upon Dewey's ideas, Jean Piaget theorized that learning and understanding required context and life experiences. Piaget's learning theory describes four progressive stages. In the first stage, Senorimotor Learning, the individual learns about himself and his environment through motor and reflex actions. The second stage, Preoperational Learning, describes how the learner uses symbols and words to describe the new learning. The third stage, Concrete Learning, involves the development of an

ability to think abstractly and to make rational judgments about concrete or observable phenomena. He is able to repeat past learning to similar situations. The fourth stage, Formal Operations require equilibration, accommodation and assimilation, active processes of self-regulation.[79,80] The learner must use his current knowledge/learning to experience and apply new information before he can accommodate this learning to change how he thinks and responds to a new experience.[81] Equilibration occurs when thoughts are formed and reformed, each at a higher level than the last. When an individual reaches this level of thinking, he can think through a problem and draw on past experiences to achieve a level of rational autonomy and independent thinking function to address a new situation.[82] While Piaget's theories were originally developed to coincide with chronological development, [79,83] these same stages of learning can be applied to any aged individual and how that individual learns new information.

Although Piaget describes Formal Thinkers of cognitive development as being entered in adolescence[79,80] investigators have concluded that only a small proportion of college students are consistently Formal Thinkers, and many college students remain consistently at the Concrete stage of thinking.[84,85] More than half of adults are late to develop formal operational abilities and are believed to be cognitively at the concrete operational stage (or at an even lower stage) during adolescence and beyond. [85,86]

To apply Piaget's stages, a learner is first able to repeat what he has learned in class, in the exact same way it was taught (senorimotor). As long as the problem is presented in the same way each time, the learner is able to think through and solve the problem (preoperational). The student recognizes problems where he can repeat the action taught, and be confident the desired outcome will occur (Concrete). When the

learner can use that original knowledge to solve the new problem, to solve problems that are different than how it was originally learned, the learner has become a formal thinker. The athletic training student demonstrates progression through these stages as he learns new information or skills. The learner initially can recognize a problem/injury from what he has observed and what was taught in class (Sensorimotor Learning). As that learner is given more information, for example when the student learns information in the classroom, whether it be medical terminology, about different pathologies and mechanisms of injuries for different injuries or rehabilitation techniques, he begins a search for information by asking questions and verifying his thoughts and conclusions aloud with his/her instructors (Preoperational Learning). The student continues to progress through the curriculum and can begin to take information he has observed and adapt and apply it to new present situation (Concrete Learning). If the student reaches the Formal Operations stage of learning, he then can modify his actions and decisions to address new learning situations by forming thoughts and re-forming thoughts at higher levels when needed by drawing upon their past experiences. For example, an athletic training student learns in the classroom how to care for an open wound. Simulated learning may be presented during laboratory classes (senorimotor and operational learner), and as long as the problem (wound) occurs in the same way as presented in class, the student is able to provide the appropriate care to manage it during clinical education (concrete learner). If the problem is different than what the student learned in class (e.g., different type of wound, size, location, required care), the student, if he has achieved the formal level of learning will use the knowledge from the past problem, reflect on it, and then adjust that knowledge/skill to solve and treat the current problem.

While both Dewey and Piaget described the learning and thinking processes in relation to experiences, these models fall short of explaining how some students can learn more and at greater depth than others, even when placed in the same situations. David Kolb developed a model of experiential learning that partially addresses these differences by addressing not only how thinking develops, but also how skill learning occurs and develops. Kolb's Theory of Experiential Learning is applicable to Athletic Training Education that requires problem solving and involves both knowledge and professional skills.

Like Piaget and Dewey, Kolb's Experiential Learning Theory describes how learning progresses between four modes of learning that require individuals to learn from the past and apply that past learning to new situations.[20] Experiential learning is a continuous process of creating tension in order to produce resolution through a process of adaptation. Through this adaptation, it is believed that individuals learn to think critically in order to solve problems; learning occurs as a result of transactions between a person and his environment.[20]

The four modes of experiential learning are concrete experience, reflective observation, abstract conceptualization, and active experimentation. The first mode of experiential learning is concrete experience where most learners begin the learning process. During this stage, the learner experiences or immerses himself in the "doing" of a task by simply carrying out the task assigned. The engaged learner does not reflect on the task at this time, but rather carries it out with intention. In reflective observation, the individual is not involved in the task but after observing the task, reviews what has been done and experienced. The skills of attending, noticing differences, and applying terms

helps identify subtle events occurring because of action. A learner at this stage demonstrates the understanding of the effects of an action and anticipates what would follow from the action if it was to be taken again under the same circumstances.[20] Abstract conceptualization involves interpreting the events that have been noticed and then realizing the relationships among them. The learner adapts to differences and is flexible among situations where similar actions are needed. Active experimentation describes how the learner can see application through action in new educational circumstances within the range of generalization. Within this context, the student takes the new understanding and translates it into predictions about what may happen next or what would happen if a specific action is performed.[20]

The Experiential Learning Process is observed during athletic training education. As skills are initially learned throughout the professional education program and further into the professional career, the learner begins each new experience as a concrete thinker performing skills from a checklist (action) or when informed of every action or step of the skills or tasks that must be performed. When maturing as a learner, the athletic training student begins to use skills he has learned and he reflects on how his actions impacted the patient's care and outcome (Reflective Observation). Further in the learning continuum, the student becomes familiar with the types of situations that occur during clinical education even though they are "new". The student can think about how he would handle similar situations and anticipate the outcome of his action(s). If the student has learned about and performed skills related to the management of an ankle sprain, when the student is exposed to a different patient who has a knee sprain, he should be able to abstract/apply the previous experience with the ankle sprain and apply it to the

similar experience with the knee sprain. An example is if the student understands the structure of a joint, he can apply the techniques for special tests from that joint to the performance of special tests at a similar joint. When an athletic training student evaluates a knee injury, he can include some universal components used in the ankle evaluation that he has experienced during clinical education and apply the concepts of the ligamentous and muscular stress tests from the ankle evaluation to tests for the knee injury. With this active experimentation, the student can select appropriate diagnostic tests to rule out differential diagnosis and conclude the appropriate diagnosis and treatment.

When a learner can solve new problems, by utilizing the skills described in each of the four modes of experiential learning, the learner is demonstrating higher level thinking abilities through critical thinking[20,36]- the process of purposeful, self-regulatory judgment.[16] The effectiveness of this type of learning relies on the individual's ability to move between these modes of learning to solve a problem.[20,36,87] If he waits until a task is completed to reflect upon it, he will have no opportunity to refine the skill until a similar skill/task arises in the same manner again. Conversely, continual reflection leaves the person spending more time on thinking than getting the task done. Kolb's learning cycle illustrates that learning requires many small and incremental improvements of knowledge and skill throughout/during the cycle.[20] Learners must shift from being "doers" to "observers who do" to being analytically detached enough to anticipate appropriate processes and outcomes of the actions that have yet to transpire.[88] Students and professionals must progress through these modes of learning repeatedly to learn from the past and take new information into future learning situations.[2,20,52] Experiential learning is

"learning through reflection on doing," which affirms the importance of experiential activities, such as fieldwork and laboratory sessions that encourage learning and reflection.[89] Kolb believes that experiencing something is not enough; one must reflect and use that experience in order to create new knowledge/understanding.[20,90] When one considers the interconnected roles of learning and experience, thinking drives doing, and doing can be improved and progressed by thinking.[13] There has been criticism of the logic and validity of each theory.[36,78,90-92] It is important to note that the theories of learning are continuingly being reviewed, researched and updated as we learn more about how people learn.

Brookfield[93] argues that a primary aim of experiential education is to develop students' critical thinking skills. The goal of experiential education is to teach students to gain knowledge within a specific discipline, and perhaps more importantly, impel them to develop the skills, habits and attitudes necessary for them be life-long learners who are able to solve a wide variety of problems, both as individuals and in relation to the larger society.[93]

Critical Thinking and the Experiential Learning Process

As Dewey developed the origins of Experiential Learning, he also was influential to the debate of critical thinking and the importance of that skill as a learner progresses through the Experiential Learning Process. [49,75] He suggested that critical thinking is a subset of the reflective process involving thorough assessment, scrutiny, and the drawing of conclusions in relation to the issue at hand. This assessment of information and decision making contributes to judgment. The importance of critical thinking in this process, according to Dewey, is that problems are subject to healthy skepticism and

timely suspension of judgment. Dewey's view of education is that an educational environment should facilitate the reflective process, be student-centered, and be realistic in order to develop a student both intellectually and morally.[75] Developing critical thinking enables a person to meet those expectations.[75]

The concept and theories of critical thinking can be traced to the Greek philosophers including Socrates, Plato, and Aristotle who stressed the need and benefits of critical thinking to society[75]as they connected education, logical thinking and questioning with moral reasoning and critical thinking.[75]

The affective description of a critical thinker is the use of skills, strategies, and dispositions of a critical thinker. The cognitive definition of critical thinking is what it is to think critically.[94] In Webster's New World Dictionary, critical thinking is "characterized by careful analysis and judgment (a sound critical estimate of the problem).[95] Critical thinking is thinking that explicitly aims at well-founded judgment, utilizing appropriate evaluative standards in the attempt to determine the true worth, merit, or value of something. Critical thinking is purposeful, evaluative, and reflective.[75,96,97] Ennis describes critical thinking as "reasonable and reflective thinking that is focused on deciding what to believe or do," [98] the process (reasonable and reflective thinking) is more important than the end product (the decision).[98] McBride describes critical thinking as reflective thinking used to make reasonable and defensible decisions about movement tasks or challenges. The student uses specific knowledge, in a logical thought process, and is held accountable for that decision.[99]

Due to varied interpretation of critical thinking, a cross-disciplinary expert panel on critical thinking was established in 1989 to, among other things, develop a consensus

definition of critical thinking.[16] The consensus statement of the definition of critical thinking and the ideal critical thinker are:

"We understand critical thinking to be purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based... The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded, flexible, fair-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry, and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit...[16]

Critical thinking is comprised of cognitive skills, respective sub-skills, and affective dispositions.[16] The cognitive skills include:

1. **Interpretation**-"To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria"(p13). Interpretation is composed of three sub-skills (i.e., categorization, decoding significance, and clarifying meaning).
    a. **Categorization** involves apprehending, formulating categories, or characterizing information.[100] In the realm of athletic training, a student who recognizes an injury, disease or condition, and then continues to define its character is able to categorize.[100]
    b. **Decoding significance** involves detecting, attending to and describing informational content expressed in a conventional communication system. This communication system may include one or more of languages, social behaviors, drawings, numbers, graphs, tables, charts, signs, or symbols.[16] An athletic training student must attend to and detect a patient's behavior during an injury evaluation, rehabilitation and/or during the on-field performance. He must be able to determine the significance of the above

behaviors and then effectively document that significance.[100] For example, a basketball player may run with a slight limp during a practice, but is able to run and change direction at full speed with no problems when he has the ball and drives to the basket. This series of information may indicate that the injury is not as significant as it first appeared.[100]

c. **Clarifying meaning**, involves paraphrasing information gained from the conventional communication system by specifying, describing or using analogies to remove any ambiguity or confusion.[16] From the previous basketball example, the athletic training student (ATS) would question the athlete or paraphrase what the athlete expressed in order to clarify any impressions and/or misconceptions that the ATS may have regarding the injury.[100]

2. **Analysis** - "To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions, or other forms of representation intended to express belief, judgment, experiences, reasons, information, or opinions."(p.14)[16] The Three sub-skills of analysis include examining ideas, detecting arguments, and analyzing arguments.

   a. **Examination of ideas**-Define terms, compare and contrast ideas, identify issues and their components and identify the role/relationship of the components to the whole.[16] The ATS compares and contrasts signs, symptoms, observational information, and testing results to arrive at an assessment of the injury. Similarly, the student also must compare and

contrast various treatment protocols, rehabilitation protocols, and specific exercises in order to determine the most beneficial.[100]

b. **Detecting arguments**- The student determines whether the presented information expressed, or intended to express, reasons supporting a claim or point of view. This component of critical thinking is utilized when the student reads research in professional journals. He decides if the results support the hypothesis set forth by the author. Upon detecting an argument, that argument then is analyzed. This involves identifying and differentiating 1) the intended main conclusion, 2) the arguments advanced in support of the main conclusion, 3) other reasons advanced as backup, 4) other unexpressed elements of the reasoning, and 5) the intended chain or reasoning.[16]

c. **Argument Analysis**- The student determines if the interpretation of the results also supports the hypotheses, or was the interpretation biased.[16]

3. **Evaluation** - "To assess the credibility of statements or other representations which are accounts or descriptions of a person's perception, experience, situation, judgment, belief, or opinion and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions, or other forms of representation"(p15).[16] The sub-skills of evaluation are assessing claims and assessing arguments.

a. **Assessing Claims** -Recognition of factors pertinent to determine the degree of credibility of information, assess the contextual relevance of information, and/or assess the acceptability of a judgment or opinion.[16]

When a salesman approaches the athletic trainer with claims about the effectiveness of supplies, modalities, rehabilitation equipment, and supplements. The athletic trainer must assess the contextual relevance of the information, principles and procedural directions. Upon determining the contextual relevance, the athletic trainer then may decide whether the equipment/product can accomplish its claims.[100]

b. **Assessing Arguments** is an encompassing task when the acceptability of the argument is evaluated; questions are anticipated, and the reasoning of the argument is assessed to determine how these components affect the strength of the argument. An ATS differentiates between reasonable and unreasonable inferences, and judge the probable strength of the premise in determining the acceptability of the argument.[16] He must draw from his knowledge base using deductive and inductive thinking, to determine the strength of the sales person's claims about the product.[100]

4. **Inference**-"To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to deduce the consequences flowing from data statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation." (p 16)[16] Inference involves querying evidence, conjecturing alternatives, and drawing conclusions.

   a. **Querying evidence** focuses on recognizing the arguments that require support or devising a plan for gathering that support.[16] When an athletic trainer decides whether or not to purchases an electrical modality, he

already has determined the strength of the sales person's arguments. He then decides which arguments require additional support and then devise a plan to gather that information through valid and reliable sources (e.g., books, journal articles, other athletic trainers, allied health professionals, friends, or other sales people).[100]

b. **Conjecturing alternatives**- The student formulates alternatives for resolving a problem or achieving a goal and then predicts possible consequences.[16] An ethical or budgeting situation would require this sub-skill of an athletic trainer.[100]

c. **Drawing conclusions requires a formulation of an** opinion or point of view regarding an argument, deducing consequences of possible actions, using appropriate reasoning skills (e.g., analogical, arithmetic, dialectical, scientific), and/or decide upon the most warranted course of action.[16] Continuing education is a major requirement for maintaining athletic trainer national certification. When presented with new information, techniques or theories, an athletic trainer weighs all information previously known and uses his reasoning skills to formulate his own opinion.[100]

5. **Explanation**- "To state the results of one's reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological criteriological, and contextual considerations upon which one's results were based; and to present one's reasoning in the form of cogent arguments." (p. 18).[16] Proficient critical thinkers cannot only state results, but they also can justify reasoning and present

arguments. Stating results simply means providing accurate statements of the results of one's reasoning. The results then may be analyzed or monitored.[16] An athletic trainer, whether teaching in class, a clinical setting or working with an athlete, will present the reasons behind his specific opinion or view that also may include incorporating research findings.[100]

After stating one's results, one must then justify those decisions by presenting specific evidence that was used to from the interpretations or conclusions.[16] In the rehabilitation setting, an athletic trainer justifies his choice of rehabilitation technique, equipment, and progression as well as his reasoning or standards for deciding upon that specific rehabilitation program for an injury.[100]

6. **Self-regulation**- "Self-consciously to monitor ones cognitive activities, the elements used in those activities, and the results deduced, particularly by applying skills in analysis, and evaluation to one's own inferential judgments with a view toward questioning, confirming, validation, or correcting either one's reasoning or one's results." (p19)[16] Self-regulation involves two sub-skills; self-examination and self-correction. The student or professional reflects on his own reasoning process, verifying the results, application and execution. This verification is performed by a meta-cognitive self-assessment or reflection on one's values, motivation, biases, attitudes and rationality. The individual then corrects or attempts to correct any deficiencies that were revealed by the self-examination.[16,100]

Need for Critical Thinking as Athletic Training Professionals

Critical thinking is a necessary condition for independent professional practice and is expected of an entry-level professional.[101] In the health professions, it is essential for clinicians to use cognitive skills or strategies that increase the probability of choosing and implementing the most desirable outcome. This purposeful, reasoned and goal-directed method for solving problems, formulating inferences, calculating likelihoods, and making decisions is critical thinking. Critical thinkers use these skills appropriately, without prompting, and usually with conscious intent in a variety of settings.[102] Critical thinking skills enable a clinician to consider multiple possibilities in clinical situations, alternatives to the data, and problems and interventions; weigh the consequences of the different alternatives; and arrive at sound decisions.[103]

The development of critical thinking skills has become a focus in many disciplines, including economics,[104] physical education,[99,105,106] physical therapy,[107]and medicine.[108] In 1989, the nursing profession mandated an emphasis of critical thinking in their professional education following the National League of Nursing's[109] mandate that nursing curricula emphasize the development of critical thinking and independent decision making. There have been numerous studies examining the effect of different curricula and teaching strategies on the critical thinking skills of nursing students.[110-121] A Delphi study aimed to define critical thinking in nursing a consensus showed that critical thinking is crucial to the provision of quality nursing care and to professional accountability.[14] Critical thinkers in nursing exhibit these habits: confidence, contextual perspective, creativity, flexibility, inquisitiveness, intellectual integrity, intuition, open-mindedness, perseverance, and reflection. Critical thinkers in nursing practice the

cognitive skills of analyzing, applying standards, discriminating, information seeking, logical reasoning, predicting and transforming knowledge.[14]

Athletic trainers are confronted daily with multiple complex problems that require critical thinking skills; therefore, the development of such skills should be an important component of athletic training curricula.[1,49] Critical thinking skills are necessary for students and professionals to evaluate new knowledge and be able to rationalize their own practices.[122] Each entry-level athletic training profession should possess all of the required knowledge and clinical skill; however, knowledge and skill alone do not make a competent athletic trainer. Every situation that an athletic trainer experiences is different and may not follow the textbook example. Critical thinking skills are necessary for the athletic training practitioner to consider many possibilities and arrive at differential assessments.[67] The appropriate treatment, referral and rehabilitation also must be determined from a vast array of possibilities. It is incumbent upon the athletic trainer to consider alternatives when determining the most appropriate interventions. The athletic trainer must understand, analyze, and interpret information to provide a differential assessment and then synthesize a plan of action.

As an athletic trainer witnesses an injury, he must have thorough knowledge of anatomy, physiology, biomechanics, and psychology and have the ability to apply this information to the specific situation. Additional information will be attained from the evaluation. The athletic trainer must analyze the new information, apply existing knowledge, and interpret the results of the examination to make a differential assessment. Once the differential assessment is made, the athletic trainer must determine the best

course of treatment, the type of referral needed, and the appropriate rehabilitation protocol.[49,100]

Although it is clear that critical thinking is necessary for athletic trainers[39,49,123] and schools include the ability to critically think among their program objectives, evidence that students are learning and encouraged to critically think during their clinical education experiences have not been validated. Information to encourage educators to include strategies and methods that promote critical thinking and clinical reasoning in athletic training has become available more recently in the form of books[3], journal articles, editorials,[39,49,53,68,124] and conference topics; however, the research has just begun to exam critical thinking in athletic training education.

Critical Thinking Learned through Clinical Education

One of the most pertinent times that critical thinking can be developed is during clinical education. In the time of Hippocrates, people learned how to provide medical care while observing those who were practicing medicine.[45,125,126] Medical students received their education while studying with experiences physicians, learning from books, and while treating patients alongside their mentoring physicians.[127] By the thirteenth century, universities were established, with medicine a viable degree.[128] Medical training included courses focusing in basic sciences and apprentice work, one of the first formal types of clinical education that involved individuals training as physicians apprenticing under a practicing physician.[127]Medical students today begin to acquire clinical skills with patients, usually in a hospital or out-patient-based clinical affiliation. This approach has been accepted by medical educators as an effective means of teaching clinical medicine for centuries.[127,129] After the Civil War (1865), the lecture was

supplemented by the section method of clinical teaching, which allowed for more personalized instruction. The section method of clinical teaching had small groups of students (8-10) spend one or two hours day, three to five days a week, observing patient care in the hospital and following the progress of selected cases with experienced physician mentors. This method of clinical education did not incorporate the principle of "learning by doing," as did laboratory instruction in the scientific courses.[125,130] Patients were cared for in the presence of students, but the students did not care for patients. This pedagogic weakness was corrected in the early 1900s by a new clinical teaching paradigm, called the clerkship, which began to be used for medical education.[125,130] During a clerkship, students were assigned four to six patients who the treated with supervision and spent much of their day carrying out duties related to their patients' care.[125] The clerkship required affiliations with hospitals and other out-patient facilities where the students complete their duties. Difficulties with establishing hospital affiliations with medical schools presented difficulties for the clerkship model of clinical education, but in spite of these, the clinical-clerkship program is still considered as a satisfactory an educational experience as it was in the early 1900s.[131,132] By 1910, the strength of the United States and Canadian medical schools was based on the basic science instruction during the first two years of education followed by clerkships. Although the academic courses at the medical schools provided students with current knowledge, instruction remained predominantly didactic, with limited clinical opportunities for the student. Hospitals began to tolerate teaching during clerkships as long as it was carefully regulated and did not interfere with patient care.[130,131] Reform in medical education continued when Abraham Flexner's report, an assessment of medical

education in North America (1910), fueled change by criticizing the mediocre quality and profit motive of schools and teachers, the inadequate curricula and facilities at a number of schools, and the non-scientific approach to preparation for the profession, which contrasted with the university-based system of medical education in Germany.[133] Many present-day aspects of the medical profession in North America are consequences of the Flexner Report including creating a single model of medical education and the heightened admission standards and stricter curriculum requirements.[134]

A more recent study commissioned by the Association of American Medical Colleges is found in the conclusions and recommendations of the Panel on the General Professional Education of the Physician (GPEP) released in 1984.[135] Among the primary conclusions of the study the clinical education of the physician is addressed. The GPEP emphasizes that the focus of learning should be on patients and their families and recognizes the necessity to define the purposes of clinical education; to specify the clinical knowledge, skills, values, and attitudes that students should acquire and develop; and to adopt explicit criteria for evaluation of the clinical performance of students.[136] As the medical field expanded over the years, medical education grew and developed to what it is today - basic science education (2 years) followed by clinical education rotations (2 years) in teaching hospitals where medical students refine their clinical decision-making abilities.[127]

The education model for health care professionals, including athletic training, have mirrored that of physicians; a foundation of didactic learning accompanied by clinical education. Athletic Trainers in the early 1900s completed courses in medicine, physiology, anatomy, or first aid and then learned the skills of athletic training as they

practiced, whether on their own or as a student intern.[45] In the mid-1900s, a formalization of athletic training education began after the formation of the National Athletic Trainers Association (NATA) in 1950,[45,46,137] but it was not until the 1950s that an evaluation of this learning was assessed and then in 1970 the NATA voted into existence the Board of Certification (BOC) which was authorized to administer the first certification examination.[45] Clinical education more formally began taking shape in 1973 when the first clinical education (a two year apprenticeship) model was defined by the NATA as a requirement for entry-level practice for athletic trainers.[45,46]

Table 2.1 Summary of Basic Athletic Training Curriculum Requirement Change

	Curriculum Requirements	Clinical Requirements	Certification
Thru mid-1800s	Physicians served as athletic trainers.[45]	NOTHING SPECIFIC REQUIRED	NONE
	Background in Physical Education Possibly – course(s) in medicine, physiology, anatomy, therapy,…[45]	NOTHING SPECIFIC REQUIRED Learn as you practice Informal clerkships, internships, or apprenticeships	
1916	Trainers Bible[45]		
1932	Cramer The First Aider[45]		
1959	Curriculum approval by NATA, Physical Education Major & Pre-Requisite for physical therapy, Teaching certificate required[45]	NOTHING SPECIFIC REQUIRED Learn as you practice	NATA certificate
1970	Five initial pathways to certification available[45,137,138]	NOTHING SPECIFIC REQUIRED Internship completion and sponsor needed to take BOC exam	BOC exam
1973	Teaching license still a requirement[138]	Work under a NATA athletic trainer for two years • In approved curriculum • For PT degree • Apprenticeship	

Mid 1970 (1975)	Science based curriculum, Athletic Training courses required, Skill competency check list used[45,46]	Clinical clock hour requirement – minimum 600 hours as internship with direct supervision of an NATA certified athletic trainer	
1979	Teaching certificate in area of choice continued to be a requirement[46]		
1982	1st Role Delineation(RD) Study completed[44]		
1983	Guidelines/Competencies developed[44]		BOC exam used RD
1983	Athletic Training Curriculum subject matter No teaching certificate required[44]	• 600-800 clinical-experience hours in approved accredited program OR • 1800 clinical hours as internship student with additional athletic training course work • required to complete experience with contact and collision sports	
1990	Majors in Athletic Training required by approved curriculum institutions[56]		
1991 - Oct	Joint Review Committee on Education Programs in Athletic Training (JRC-AT) established - under Commission on Accreditation of Allied Health Educational Programs (CAAHEP)[57,139]		
1992	Athletic Training Educational Competencies established - five domains[6,140]		
1999	Athletic Training Educational Competencies established - twelve content areas[6,140]	Clinical proficiencies added within appropriate content areas	
2002		Clock hour requirement removed – focus on quality of clinical education with proficiencies[47,141]	
2004	No internship option available - must complete curriculum program through undergraduate approved program.[47,141]	Proficiency focus during clinical education	
2006	Competencies revised and 12 content areas subcategorized according to 1. Cognitive competencies: knowledge and		

	intellectual skills 2. Psychomotor competencies: manipulative and motor skills 3. Clinical proficiencies : decision-making and skill integration[6]		
2006-June	JRC-AT became independent from CAAHEP and changed name to Commission on Accreditation of Athletic Training Education (CAATE). Responsible for accreditation of undergraduate programs. The Standards for Accreditation have embedded in the NATA Educational Competencies and Clinical Proficiencies.[139]		
2012	NATA Athletic Training Education Competencies 5th edition of minimum requirements for ATS professional education. 12 content areas reorganized into 8.[15]	Clinical Integrated Proficiencies (CIPs) assessed in ATS performance on actual patients	

Changes in the athletic training education curriculum over the years, including both didactic and clinical requirements, have resulted in a shift away from the quantity of clinical education (hours requirement) to the quality of clinical education using markers (i.e., Proficiencies).[40,140,142-144]

The clinical education requirements and process is a part of the evolution that has occurred for entry-level athletic training education. Structured clinical education plays a vital role in helping the athletic training student develop critical thinking and clinical decision-making skills, as well as professional socialization.[8] The Commission on Accreditation of Athletic Training Education (CAATE) has implemented a strict competency based curriculum[7] that includes a focus on supervised clinical education/experiences that mirror the qualification of other allied health professions and

the medical model. Clinical education, as defined in the CAATE Standards, is the "application of knowledge and skills, learned in the classroom and laboratory settings, to actual practice on patients under the supervision of an Approved Clinical Instructor (ACI) or Clinical Instructor (CI)"[7]while under the supervision of a qualified instructor.[7] The goal of clinical education is to provide the student with quality learning experiences while helping the student to become a better clinician by facilitating the transition from simply doing a skill correctly, as directed by his Instructor, to incorporating the skill proficiently in the clinical environment, encouraging both skill mastery and integration based upon sound critical thinking, problem solving and clinical decision-making.[9,10] This goal of athletic training clinical education reflects the learning theories of Dewey, Piaget, and Kolb who described learning undertaken when people are given a chance to acquire and apply knowledge, skills and feelings to an immediate and relevant setting.[36] The central component of the clinical education experience is the core principle Experiential Learning.[13,20,21] Experiential education is designed to encourage the student to gain knowledge within a certain area of discipline and, perhaps more importantly, impel him to develop the skills, habits and attitudes necessary to solve a wide variety of problems, both as an individual and in relation to the larger society.[93] For the athletic training student, the environment where experiential learning occurs is the clinical setting during clinical education experiences. Athletic training clinical education experiences must occur in supervised clinical instruction sites where a CI interacts with the students.[7] Clinical education and experiential learning share a common goal of developing critical thinking skills.[20,36]

Supervision During Clinical Education

The definition of supervision, similarly to that of critical thinking, comes from many different directions and encompasses many characteristics. Bernard & Goodyear[145] define clinical supervision as "an intensive, interpersonally focused relationship" in which the supervisor, a senior member of the profession, is designated to facilitate the development of therapeutic competence in the student, a junior member or members of that same profession. This relationship is evaluative, extends over time, and has the simultaneous purposes of enhancing the professional functioning of the junior member(s), monitoring the quality of professional services offered to the clients, and serving s a gatekeeper of those who are to enter the particular profession.[145,146147,148] Holloway defines supervision as "a formal relationship in which the supervisor's task includes imparting expert knowledge, making judgments of the trainee's performance, and acting as a gatekeeper to the profession".[147,148]

The process of supervision occurs within the relationship established between the supervisor and student. It is important to recognize that both parties must contribute to the relationship and have responsibilities within that process. An assumption of supervision is that it will last long enough for some developmental progress to occur in the student. Supervision is differentiated from brief interactions and consultation that, by definition, is time and session limited, although all of these interactions share common goals (such as training in a skill, clarification of process, regaining objectivity). The fact that supervision is ongoing allows the relationship to grow and develop.[146] Haynes, et al state that "A primary aim of supervision is to create a context in which the supervisee can acquire the experience needed to become an independent professional."[149]

Educational programs of different health and medical disciplines have developed supervision models. Models are intended to aid in interpreting and understanding complex phenomena, and provide a framework for clinicians to practice and communicate.[150] There are a number of models of supervision, four of which are used most frequently during clinical education: Developmental Model, Social Role Model, System Model, Integrative Model.[150]

The developmental model advocates that supervisors match the structure and style of supervision to the student's level of development. This model incorporates the concept that students move through a series of developmental steps or progressive stages[132,147,148,151-155] from novice to expert with each stage consisting of discrete characteristics and skills.[150] As the student grows and develops, the supervisor brings in additional information needed to widen the knowledge base of the student, which in turn, leads to independence.[150] This conversion from novice to expert occurs as developmental milestones including: fear, anxiety, uncertainty, feelings of inadequacy, over identification with clients, conflicts in values, remaining unbiased, and being nonjudgmental are overcome.[150,152]

In the development model, students at the beginning or novice stage are expected to have limited skills and lack confidence in those skills, while middle stage supervisees might have more skill and confidence and have conflicting feelings about perceived independence/dependence on their supervisor. A student at the expert end of the developmental spectrum is likely to utilize good problem-solving skills and be reflective about his skills and the supervisory process.[149,156] According to these models, a supervisor's responses to students should differ based upon the student's stage of

development.[154] Students at lower levels of development are more concrete thinkers who are dependent and require more structure; therefore, a supervisor should encourage more behavioral tasks and provide more direction is a supportive and directive manner. More advanced students have more complex thinking, have more tolerance for ambiguity, and require a supervisory environment that is less structured and more collegial. With advanced student's the supervisor should be more of a supportive mentor focused on interpersonal processes and personal development.[18,157,158] Supervisors adapt their supervision to the developmental needs of students', continually assessing and flexing their supervisory skills to match their students' changing requirements.[157,158] To promote students' development to higher stages, the supervision environment should be structured at one to two stages higher than trainees' actual level of maturity.[157,159149,156] For supervisors employing a development approach to supervision, the key is to accurately identify the student's current stage of learning and provide feedback and support appropriate to that developmental stage, while at the same time facilitating the student's progression to the next stage.[151,153,155,156] The interactive process of the supervisor with the student is often referred to as "scaffolding"[160] The supervisor encourages the student to use prior knowledge and skills to produce new learning. As the student approaches mastery at each stage, the supervisor gradually moves the scaffold to incorporate knowledge and skills from the next advanced stage. Throughout this process, not only is the student exposed to new information and skills, but the interaction between supervisor and student also fosters to development of advanced critical thinking skills. A student may be in different stages simultaneously; that is, the student may be at mid-level development overall, but experience high anxiety when faced with a new situation.[156]

The social role model specifies that the supervisor acts and performs certain roles, tasks, and functions that take into account behaviors, beliefs, and attitudes that the student is expected to emulate. It is through this modeling of behaviors, attitudes, and tasks that the student learns what is required in order to achieve independent status and emulates those professional behaviors. Competency occurs when these behaviors, attitudes, and roles become entrenched in the student.[150]

The system model emphasizes a learning alliance between the supervisor and the student based on the relationship that is developed between the parties. In this model, the supervisor and the student are in the growth process together. The growth and development of the student is brought about through the interconnectedness of the two parties that is built through a relationship.[150] In the System Model of supervision, the goal is for the student to learn a broad spectrum of skills, attitudes, and knowledge and will be successful supervision when a professional relationship that is ongoing and mutually evolving develops between the supervisor and student.[147,148] Interaction between the supervisor, student and patient become the instructional process that enables the student to grow and develop. In the System Model, the student gains empowerment, skill, and knowledge as the supervisor teaches and articulates information in an interpersonal exchange of ideas and practices[147,148,150] that is mutually involving and aimed at bestowing power to both members.[147,148]

The integrative models of supervision rely on more than one theory and technique. Given the large number of theories and methods that exist with respect to supervision, an infinite number of "integrations" are possible. One of the most researched developmental models of supervision is the Integrated Developmental Model (IDM)

developed by Stoltenberg in 1981 and further developed in 1987 and 1998 by Stoltenberg and associates.[156] The IDM describes three levels of supervisor development. The ***Supervision Level Scale*** (SLS) present an elaboration of Stoltenberg's model in grid form (Appendix B). [152,156,161] The IDM stresses the need for the supervisor to utilize skills and approaches that correspond to the level of the student. If a supervisor consistently mismatched his responses to the developmental level of the student, it would likely result in significant difficulty for the student to satisfactorily master that developmental stage. For example, a supervisor who demands autonomous behavior from a level-1 student is likely to intensify the student's anxiety and thereby prevent development and progress toward the next level of ability/skill.[156]

Wiley's study categorized students by predominant developmental level as opposed to training level, because data suggest that supervisees training levels differ from developmental level throughout training in a manner somewhat consistent with Stoltenberg's Developmental Model.[161] Supervisors in Wiley's model describe themselves as providing different levels of supervision for students in accordance with a developmental supervision model, although significant differences existed only between Levels 1 and 4.[161] Supervisors reported making supervisory changes during individual supervision sessions, rather than the adoption of a general supervisory style. Data suggest that supervisors intuitively vary their styles according to their perceptions of the developmental level of the students.[161] The integrative developmental supervision model is designed to enhance problem-solving skills, creativity, emotional awareness, and students' confidence and self-efficacy regarding the use of effective clinical practices.[163] When the supervisor correctly assesses the student's current level of competence and

decision making, the supervisor is able to adjust their responses to the student during clinical education experiences to allow for enhanced learning.[158]

Competency-based, outcome-focused training is gradually replacing the more traditional master-apprentice teaching of clinical skills.[162] This change requires a different approach to the assessment of clinical competence, especially given the decisions that must be made about the level of independence allowed to trainees. The level of competence achieved by a supervisee does not automatically translate into more independent practice.[162] Dijksterhuis (2009) completed a qualitative study using focus group recordings of supervisors and supervisees in post-graduate obstetrics and gynecology training in the Netherlands. Two higher-order themes emerged; factors that determine the level of competence of a trainee in a clinical procedure, and factors that determine the level of independence granted to a trainee or acceptable to a trainee.[162] These factors include the trainees feeling of competence, knowing one's own limitations and capabilities, supervisor determining whether the a trainee is sufficiently competent to handle specific situations, and previous experience of the supervisor and trainee.[162] Dijksterhuis (2009) recommended that incorporating competence assessment and formalizing decisions regarding the level of independence a trainee should be granted would be a more clear and fair way to determine the level of supervision a student be granted.[162]

Systematic reviews of clinical education supervision models for physiotherapy students have found few experimental studies but lots of unjustified opinions.[164] There is currently no "gold standard" model of clinical education and supervision. The perception

that one model is superior to any other is based on anecdotes and historical precedents, rather than on meaningful, robust, comparative studies.[164]

Supervision During Athletic Training Clinical Education

Over the past decade, educational reform has redefined the structure of the athletic training student clinical supervision, yet as the clinical education requirements have been refined over the past 40 plus years, the requirement of direct supervision has remained consistent, with minor definition changes over the years. This evolution in the definition of supervision occurred primarily, because the earlier definitions of supervision were less descriptive and led to many clinical situations that, due to a lack of staffing of the certified athletic trainer and the increased demand upon the small work force as athletics grew, often led to the athletic training student and athletic training intern being used as cheap labor rather than about being students who needed to be educated.[30,141,165] The current standard for direct supervision of the athletic training student has substantially decreased this former misuse of students serving in the place of the certified athletic trainer and has allowed for better control of the students' formal education requirements.[30]

Table 2.2. Definition of Direct Supervision of Athletic Training Student in Clinical Education Setting

1978	"Apprentice must have continual communication and supervision on a regular basis and the supervising trainer must be ultimately responsible legally for the care of the athletic team if any non-contact hours are to be approved. Direct contact hours of supervision may be approved for athletes not legally under the supervising trainer if he/she is directly supervising the apprentice trainer in their care (at track meets, etc.). Communication for non-contact hours must be personal and continual on a regular basis with physical presence required for a minimum of two days a week"[55]
1983	Clinical experience...under the direct supervision of an NATA Certified Athletic Trainer in an acceptable clinical setting.[44]
1987	"as defined by the NATA, Direct Supervision involves daily personal contact between the Supervising Athletic Trainer and the Student Athletic Trainer in the

	same athletic training setting. Direct Supervision - the supervising athletic trainer shall afford supervision adequate to assure (following written/verbal instructions) that the student performs his/her assignments in a manner consistent with the standards of practice in the profession of athletic training."[56]
1997	Supervision involves daily personal/verbal contact at the site of supervision between the athletic training student and the certified athletic trainer who plans, directs, advises, and evaluates the student's athletic training experience. [141]
2001-current	Direct supervision - a physical presence of the clinical instructor allowing for "visual and verbal" contact between the clinical instructor and the student with the "ability for the clinical instructor to intervene on behalf of the patient." [5,7]
2005	Supervision of the athletic training student during the clinical experience - the ACI and/or CI must be physically present and have the ability to intervene on behalf of the athletic training student and the patient.[7]
2007 CAATE update	The latest interpretation of direct supervision does encourage graded autonomy and independent actions by the athletic training student[29]

The evolution of this latest definition also may be attributed to both societal and professional practice changes. Today's health care is flush with liability and risk of litigation. These legal concerns have led to changes in the level of oversight of non-professionals and students and the enforcement of direct supervision requirements by accreditation agencies. [9] Until 1999, athletic training student often were placed in situations where they were unsupervised for the majority of their clinical experiences. Students often functioned as part of the athletic training staff and made decisions regarding injuries and care without proper knowledge and/or supervision. [34] Today, an unsupervised student may not perform the services that only a BOC-certified athletic trainer may provide.[7,166] The athletic training student is no longer able to volunteer as a first responder for any unsupervised care or provide unsupervised medical coverage at any time. Unsupervised experiences put an Athletic Training Education Program (ATEP) in violation of the Commission on Accreditation of Athletic Training Education (CAATE) current standards, [7]increases the liability of the sponsoring institution and it affiliated clinical sites, and often violates state practice acts. Athletic training education

programs accredited by CAATE must adhere to its standards and guidelines, including the type of clinical supervision during clinical experiences.[7] The CAATE Standards specifically require that all clinical experiences must be conducted under the direct supervision of a qualified ACI or CI in an appropriate clinical setting.[7] The current definition by CAATE of direct supervision includes that the ACI/CI must be physically present and have the ability to intervene on behalf of the athletic training student to provide on-going and consistent education,[7] and that the ACI/CI must consistently and physically interact with the athletic training student at the site of the clinical experience.[7]

CHAPTER 3: Methodology

Restatement of Problem

Review of the literature reflects the growing interest in clinical education of health care professionals, including athletic trainers, and the critical thinking skills necessary for them to be proficient in the skills required by the profession. A concern from AT professionals is that there is a decrease in the ability of entry-level athletic trainers critical thinking abilities and a decrease of confidence in their clinical decision making skills. A primary theory explaining why this has occurred is that the direct supervision that the CI gives the ATS during clinical education results in a barrier preventing the ATS from developing these skills sufficiently. An examination of the CIs' supervision responses to the ATSs' critical thinking skill levels during clinical education has not been examined to date. The purpose of this study is to examine the critical thinking skill level of the ATSs and the CIs' supervision responses to the ATSs' critical thinking skill levels.

Subjects

The subjects in this study were Clinical Instructors (CIs) and Athletic Training Students (ATSs) from a convenient sample from the Commission on Accreditation for Athletic Training Education (CAATE) accredited athletic training education programs in Pennsylvania. The subjects were solicited through their respective ATEP Program Directors or their designees prior to the Fall 2012 academic term. Students and CIs from the primary investigator's institution were solicited only for their participation in the instrument validation and reliability processes used in this study. Only students currently enrolled in active clinical education experiences and their assigned CIs were included in

the sample. The ATS and the supervising CI were matched to ensure that every student participating in this study was evaluated by the supervising CI in accordance with CAATE requirements.

Institutional Review Board (IRB)

Institutional Review Board Approval (Appendix C) was obtained from Duquesne University through an exempt review process. IRB approval was obtained from all participating institutions if required. All research participants (ATSs, CIs) read and signed an informed consents to participate in this project.

Study Design

This was a descriptive research design with the purpose of describing the impact of ATS critical thinking skills on supervision responses during clinical education of the ATS and the relationship between critical thinking skills and perceived level of supervision provided by the CI. Descriptive data were collected from the ATSs and CIs. Analysis of perceived clinical supervision levels of the CI from the ATS and CI was described, as well as any changes that occurred in the perceived clinical supervision level of the CI over a period of time (one traditional fall clinical education experience). Correlations and t-test were used to analyze the data.

Research Questions

Research Question 1

What are the critical thinking skill levels of the ATSs, and how do they change during the clinical education experiences?

Research Question 2

Is there a relationship between the CIs' self-perceptions of their supervision responses and the ATSs' perceptions of the CIs' supervision responses?

Research Question 3

Are the CIs' supervision responses consistent with the ATSs' critical thinking skill levels, and are the critical thinking skill levels consistent with the CIs' supervision responses?

Research Question 4

Is there a relationship between the change of the ATSs' and CIs' perceptions of the CIs' supervision responses and the changes in the ATSs' critical thinking skill levels?

Instrumentation

There were three tools that were used in this study – the California Critical Thinking Skills Test (CCTST-Appendix D), ATS Perception of Clinical Instructor Supervision Response (S-PS-Appendix E) and the CI Self-Evaluation of Supervision Response (CI-S-Appendix F).

California Critical Thinking Skills Test (CCTST) - The CCTST measures the American Psychiatric Association (APA) Delphi conceptualization of critical thinking. Items selected for inclusion in the CCTST cover the domains of the critical thinking cognitive skills identified by the Delphi study experts: interpretation, analysis, evaluation, explanation, and inference.[17] It is the product of research aimed at measuring high stakes reasoning and decision making processes.[17] Peter Facione, et al. determined content and criterion validity of the CCTST and also confirmed that the questions were discipline neutral, and had minimized sex-role and social class biases.[167-170] Reliability of

the CCTST was demonstrated with KR-20 ratings of .68-.70, which is well within the KR-20 range (.65-.75) recommended by Norris and Ennis.[167,168,171]

Each ATS participating in the CCTST survey received a Cap Score (answer) sheet and a new test booklet; however due to expense of purchasing and processing the CCTST, not all subjects included in the overall sample were included in this phase of the study. Four of the participating institutions were selected, (two NCAA Division I-one each from SE and SW PA; two NCAA Division II-one each from NW PA and SW PA) to provide the sample used for analysis. The ATS were assigned a test-taker unique ID number. This ID number was a 9 digit number as recommended by Insight Assessment, the distributer and scorer of the test. The Group indicator field corresponded with the institution's ID number for this study. Test-taker instructions were included with every test booklet. The proctor read the instructions as the ATS group read along. The testing session was timed, and each person had 45 minutes to complete the test as determined by Insight Assessment. The test proctor collected the testing materials when the student was completed. When all participating ATS completed, the test the proctor returned all testing materials to a third party not directly involved with this research project who ensured that all appropriate items were returned and who then de-identified the data before turning that data over to the primary investigator.

The Cap Score Response Forms was mailed to Insight Assessment for scanning, scoring, and basic statistical analysis. Test results were e-mailed to the primary investigator within 20 working days of receipt of the Cap Score response forms.

ATS Perception of CI Supervision Response Survey (S-PS) and CI Self-Evaluation of Supervision Response Survey (CI-S) - Following an extensive review of literature

focusing on learning theories, critical thinking skills and supervision models, the Integrated Developmental Model (IDM) of supervision[12,158] was determined to be the most consistent with the goals of athletic training clinical education.

The IDM attempts to identify the progress of the student through a developmental continuum using evaluative criteria for motivation, autonomy, and self/other awareness categorizing students according to a level of development : Level 1 - beginning student, Level 2 - intermediate student, Level 3 - advanced student. It was necessary for the supervisor to recognize the continuous learning process for each student as the student exhibited behaviors consistent with more than one level of development at any given time for different proficiencies and adapt their supervision responses accordingly.[12,18]

Cal Stoltenberg developed the Supervisee Levels Questionnaire-Revised (SLQ-R) based on the IDM of supervision levels to assess supervisors' responses to graduate counseling student supervisees - during counseling sessions led by the students.[12] The SLQ-R was used as the framework from which the CI supervision survey's for this study were created. Verbal permission for use and modification as needed was granted to the primary investigator from Dr. Stoltenbeg, the original SLQ-R survey author, on April 12, 2012.

The S-PS and CI-S were created by the primary investigator in consultation with her dissertation chair who is a survey research expert and a content expert in athletic training education. The S-PS tool was the first tool to be developed using the evaluative criteria of the clinical integrated proficiencies (CIP) for content and the IDM supervision criterion. The CI-S tool then was developed using the same wording and content with a change only to shift focus of the ATS to the CI completing the evaluation.

The content of the surveys were derived from the required knowledge and clinical skills component of the clinical integrated proficiencies (CIPs), which are "the synthesis and integration of knowledge, skills, and clinical decision-making" of an athletic training student.[15] In most cases, assessment of the CIPs are designed to occur when the student is engaged in real client/patient care and maybe be necessarily assessed over multiple interactions with the same client/patient.[15] Questions for the survey were worded in such a way that advanced students should receive higher scores on the questions than would beginner students. This would reflect that advanced students were placed in situations that utilized the students' strengths, challenged the students to address their weakness, required them to provide rationales for choices and decisions, and allowed them to perform skills independently.

The CI supervision response tools were used to assess each IDM criteria that the ATS demonstrated during clinical experiences when performing the CIPs. Responses were provided on a five point Likert scale to force a directional response by the student and the CI. The scale allowed for a report of the CI supervision responses of Almost Always to Not Observed. The specific IDM criteria questions were:

Motivation - My clinical instructor allows me to perform these skills without his/her intervention (independently).

Self-Awareness - My clinical instructor places me in situations that utilize my strengths and challenge me to address my weaknesses.

Autonomy - My clinical instructor requires me to provide a rationale for the choices and decisions I make.

Finally, a participant demographic questionnaire (Appendix G) was developed for all subjects to complete at the time the Onset of Clinical Experience survey was completed. Information collected from the demographics questionnaire was used to analyze the variance of other variables that may impact the critical thinking of the ATSs. Some of the items collected from the CIs included the number of years certified as an ATC, total number of years as a CI, route to certification, current setting for clinical education, evidence of formal education to be a CI, formal education in teaching, and formal teaching experience. Items from the ATS demographic questionnaire included the number of years completed in ATEP, number of clinical experiences completed, age, gender, participation in any teaching experience.

Three main constructs were used in the development of the survey instruments.

Construct #1: CI supervision of the ATS is conducted in a manner that allows the ATS to use CTS during clinical education experiences.

Construct #2: CIs assess ATSs' CTS and modify the levels of supervision of the ATSs depending on the CTS demonstrated by the ATSs during clinical education experiences.

Construct #3: ATSs who have high levels of CTS are given increased opportunities to demonstrate autonomy, motivation and self-awareness during clinical education experiences than are those with lower CTS.

The S-PS was developed first based upon content of the CIPs. The criteria for the supervision responses were then developed based upon the IDM criteria of student learning level for motivation, autonomy and self/other awareness. Each survey question was reviewed by an AT educational content expert who also had survey development

expertise, to assure that the IDM criteria were clearly used for assessing the supervision responses to the level of autonomy, motivation and self and other-awareness of the student during clinical education, as well as to the appropriateness of the terminology used for the individuals taking the current survey. The content validity and criterion validity of the instrument were evaluated using a Table of Specifications (Appendix H) that delineated both a comprehensive component of the CIPs (content validity) and the evaluative criteria of the IDM (criterion validity). Upon completion of content and criterion validity for the S-PS survey, the survey was modified to include language appropriate for the CI to form the CI-S survey. Survey completion took approximately 30 minutes for either the S-PS or the CI-S survey.

The face validity of all instruments was assessed by two experienced athletic training educators, one who also was a survey development and AT education expert. The ATS-PS survey questions then were given to six professional phase athletic training students at Waynesburg University, a CAATE-accredited ATEP, who had just completed the ATEP requirements and were eligible to sit for the BOC examination. The participants were asked to review the wording of the questions for clarity, as well as the intent of the questions for the structures of motivation, autonomy and self-awareness. The students also were asked to describe the overall theme of what they thought that students assessed with these tools would be evaluated on by CIs. The CI-S instrument was given to three experienced clinical instructors at Waynesburg University. A similar face validation review was conducted with each Waynesburg University CI, with additional discussion of what he/she might expect from a student that would help to determine modification of supervision given during the clinical experience. These

reviewers were asked to complete the survey based upon their availability, current status and experience. Following the completion of the instrument, which was timed for future information, the ATS and CI groups were interviewed separately for their interpretations of each of the questions, their general reactions to the instrument, and their opinions regarding ease of completion. Their opinions were noted, and the primary investigatormade subsequent modifications in the instrument to address those concerns. The concurrent validity of the evaluations will be determined later in the study as the results are reviewed using the CCTST (previously validated) and the supervision tools. Prior to data collection and reliability assessment of the tools, Waynesburg University and Duquesne University's Institutional Review Board (IRB) reviewed and approved this study.

Reliability

The reliability of the ATS Perception of the Clinical Instructor Supervision Response Survey (S-PS) and the CI Self-Evaluation of Supervision Response Survey (CI-S) was also determined using a test-retest method. The survey was completed two times, with a one week interval between administrations, by the Waynesburg University students who were not included in any other portion of the study.

The S-PS survey was given to 26 athletic training students currently enrolled in active clinical education in the athletic training education program at Waynesburg University in Pennsylvania who were requested to participate in the study. 25 students participated completing both rounds of surveys to have matched pair of data for analysis.

Table 3.1 presents demographic information for the 25 students who participated in the reliability study.

Table 3.1 Athletic trainer student demographic information

n=25

Gender	Males	9 (36%)
	Females	16 (64%)
Median Age		20 (Range 19-22)

Table 3.2 Academic and clinical level of ATS

n=25

# of academic years completed	1	7 (28%)
	2	8 (32%)
	3 or more	10 (40%)
# of clinical experiences completed prior to survey	0-1	7 (28%)
	2-3	7 (28%)
	4-5	8 (32%)
	6-8	2 (8%)
	Not answered	1 (4%)

The Clinical Instructor survey(CI-S) was distributed to 5 CIs for the Waynesburg University ATEP. Four CIs completed the survey for the ten students they supervised during clinical education, for a total of ten matched pair surveys for reliability analysis. All four participants were male, ranging in age from 22 years to 51 years.

Analysis procedures treated the 5-point Likert scaled responses as interval level data. Nunnally[172] stated that Likert scales work like interval scales in that the numbers appear to be in equal intervals. A Cronbach's alpha and paired T-test parametric tests were used to analyze the reliability of the instruments. Kline[173] noted that the generally accepted Cronbach alpha value of .8 is an appropriate reliability level for cognitive tests such as intelligence tests; for ability tests, a cut-off point of .7 is more suitable, and when dealing with psychological constructs, values below even .7 can be accepted. Cronbach suggested that if several factors exist, then the formula should be applied separately to items relating to the different factors.[174]

Cronbach's alpha reported internal consistency for the following constructs: overall survey, motivation, self-awareness, and autonomy for both surveys. Table 3.2 shows Cronbach's alpha and paired T-test for the S-PS and CI-S reliability of the overall survey and the three constructs of supervision. Survey responses that were left blank were not included in the study.

Table 3.3 Cronbach's alpha and means for reliability of the overall survey and three supervision constructs

Constructs	S-PS N=25		CI-S N=10	
	Alpha	Mean	Alpha	Mean
Overall survey	.831	2.05	.948	1.85
Motivation	.944	1.76	.972	1.30
Self-Awareness	.965	2.18	.950	1.20
Autonomy	.973	2.08	.875	2.35

Cronbach's alpha reported test-retest consistency reliability for the constructs of motivation, self-awareness and autonomy as well as the overall reliability of the instruments. The paired T-test reported statistically significant difference in the test-retest at α .05 in 12 questions when assessing the individual constructs and no statistically significant difference in 72 pairs overall. This demonstrates internal reliability of the survey.

Procedures/Data collection

Six months prior to data collection, the primary investigator contacted the program directors (PDs) of the CAATE-accredited programs in the Commonwealth of Pennsylvania via email and phone to determine initial interest of having their students participate in the research study. 14 of the 20 programs responded positively with an

estimated 400 students eligible for participation. IRB approvals were received from participating institutions prior to any solicitation for participation or gathering of documentation from students. The PD initial information packet (Appendix H) was sent as an email attachment to all PDs from participating institutions when approval was received. The packet included:

Program Information Form- requesting contact information for the PD and/or designee who proctored, collected and returned all survey information, and the institutions IRB approval processes and contact information.

Program Matrix of CIP- Identified the term that the ATS should have been able to demonstrate the CIP during clinical education experiences fall 2012 semester This form was used to match data between the CI and ATS and to blind the primary investigator.

Clinical Assignment Table that requested ATS name, level in program, start and end date of clinical experience for fall 2012 semester, ATS CI assignment for fall 2012 semester. This form was used to match data, as well as to provide a unique code for each participant and institution which was used for blinding the primary investigator.

The primary investigator followed up with the PDs by phone and email to assure that they received the packet and to answer questions about the materials to be completed. When the PD information was completed, it was returned to a third party not involved with the research study who de-identified the forms thereby blinding the primary investigator. Forms were then given to the primary investigator to code and prepare for data collection.

The ATS and CI subjects participated during two data collection times. Each sampling was conducted in the same manner: onset of clinical experience during the fourth week of the ATS clinical education experience with the assigned CI and end of clinical experience during the final week of clinical education experience during the fall 2012 semester. These times were determined from the PD packet information. All forms were sent via US mail two weeks prior to each data collection time to the PD/Institutional Representative (IR) along with specific directions for distributing and administering each tool (Appendix I), #2 pencils to use for completion of forms, and a self-addressed pre-paid envelope to return all survey items upon completion.

S-PS: The ATS completed the survey and demographic information in a structured classroom environment which was proctored by the IR. The survey was completed in a classroom setting. The IR distributed the surveys. Each S-PS was pre-coded. The IR recorded the student name beside each code, so that all documents for that student were coded with the same code. The IR returned all ATS forms to a third party not involved with the study in a provided self-addressed stamped envelope within one week of the stated completion date.

CI-S: The IR received a sealed envelope labeled for each CI containing the CIs' coded (matching the ATS the CI supervised) surveys with directions. The IR ensured that the CI survey tools were delivered to the CIs and instructed them to complete one survey in a quiet and confidential environment for each ATS he/she supervised survey within one week of receipt. The CI was provided with an envelope to place the completed survey(s), seal and return directly to the primary investigator upon completion.

CCTST: The primary investigator selected four institutions to complete the CCTST to administer to the ATS during the first and second data collection periods. These institutions were a stratified convenient sample selected from different regions of the state of Pennsylvania. The number of institutions participating in the CCTST part of the project was limited for three reasons; 1- The expense of purchase and analysis of the CCTST for each participating ATS to take the test exceeded the budget for this research. 2- The CCTST has not yet been validated with ATS, and 3 - data from this study could be used to validate the CCTST for ATS. The ATSs completed the CCTST in a classroom setting proctored by the IR. The CCTST and distribution instructions were included with the survey packets delivered to the IR. The CCTST could be administered at the same time as the ATS-S, but this was not required due to possible time constraints.

E-mail reminders to the IR were sent with the completion dates and return instructions. The IR gathered all materials within the designated time frames and returned them to the primary investigator in pre-paid envelopes.

Blinding of Material

To keep the primary investigator blinded to the subjects and the ATEPs involved, forms were de-identified and then coded by a third party not involved with the study prior to distribution, so that upon completion and receipt of the returned surveys, the primary investigator remained blinded. Information from the PDs' initial information packets were de-identified and coded prior to forwarding them to the primary investigator for survey preparation.

- Program Information Sheet - Institution code that was consistent for every form from that institution.

- Clinical Assignment Table - each participating institution, ATS and corresponding CI was coded

    Institution: A-Z

    ATS: 1-x

    CI: 1-x

        Example: Institution code W, Matt ATS coded ATS-W1, and his CI CI-W1. Matt's CI also may be Mary's (ATS-W16) CI, so a second survey code for this CI was CI-W16. The CI completed a survey specific to each ATS that CI is supervising during the research time.

- Code table/key was developed for each participating institution with the code for the institution, ATS and CI.
- PD matrix of CIPs - Matrix was coded with institutions designated code,

All forms were blinded prior to return to the primary investigator. When the forms were returned, the data were inputted to a database for future analysis. The primary investigator was continually blinded to any identifying information throughout the data analysis process.

Confidentiality

All original forms with identifying information were coded by a third party not involved with the study who kept these forms in a locked file cabinet that was not accessible to the primary investigator. All coded material and survey results also were kept in a locked file cabinet accessible only to the third party during data analysis. Upon completion of data analysis, all identifying documents were shredded and disposed.

Data Analysis

The data collected in the study were analyzed using the SPSS program version 18.0 and Microsoft Office Excel 2007.[180] Descriptive statistics with frequency distributions of data and comparison of two groups were used. Correlation statistics as well as t-tests were used to evaluate the research questions. The statistical power for all comparisons in the data were be analyzed at $p < .05$.

Assumptions

1. CCTS test was appropriate to use for assessing the critical thinking skills level of ATS, since it had been used previously for assessment of other health professionals.
2. The three levels of learning development reflected in the IDM of supervision are the learning development levels of the ATSs.
3. The supervision structure of the IDM accurately reflected the intended levels of supervision for the ATSs.
4. The CI-S and ATS-PS developed for this research appropriately applied the IDM structures of motivation, autonomy and self/other awareness for evaluation of the CI supervision of successful performance of CIPs.
5. CIPs depicted the skills required of entry-level athletic trainer.
6. The CIs accurately self-evaluated their supervision responses of the ATSs.
7. The ATSs accurately evaluated their perceptions of the CIs' supervision responses to their levels of learning.
8. The ATSs had the opportunity to complete every CIP that had been learned previously to the point of the survey distribution during the fall clinical experience.

9. The CIs supervised the ATSs daily and at a sufficient level to develop a comprehensive understanding of the ATSs' knowledge and abilities.
10. If the ATSs had high levels of CT skills as assessed by the CCTST, then the ATSs exhibited clinical behaviors consistent with their skill levels.
11. The CIs and the ATSs perceived the CIs' supervision levels/characteristics the same.
12. If the ATSs had high levels of CT skills (assessed by the CCTST), the ATSs demonstrated high levels of thinking consistent with Kolb's Model.
13. The CCTST assessed the IDM model of level of learning for the ATS: a high level of critical thinking skills as determined by the CCTST correlated to an advanced level of learner on the IDM scale.
14. PDs and their designees followed directions and turned in all information required at specified intervals and deadlines and in the manner required by the primary investigator.

Limitations

1. During the clinical education experiences completed during this study, the ATSs may not have had exposure to all CIPs that they were required to complete as determined by the PDs' matrices of CIPs.
2. The sample was comprised of CAATE-accredited ATEP in Pennsylvania which limited the ability to generalize the results.
3. Reliability of ATS Survey (ATS-PS) and the CI Survey (CI-PS) was not completed in advance of the start of this study but rather was included as a first step in the study process.
4. Data were collected over one clinical education experience in the fall.

5. Data that were collected during this project provided additional information not used to answer the current research questions, but may be used for future research using this data set.

CHAPTER 4: Results

This investigation was an original pilot study that examined the critical thinking skills of AT students with a purpose to discover changes in the students' critical thinking skill levels during one clinical experience, to examine the influence of the ATSs' critical thinking skills and the CIs' supervision responses, and compare the ATSs' and CIs' perceptions of CI supervision responses to the ATSs' critical thinking skill levels.

Descriptive Statistics

Demographics: Pilot Study

Nineteen undergraduate CAATE accredited entry-level athletic training education programs in Pennsylvania were solicited to participate in the study with the potential participation of approximately 600 athletic training students and their CI's. Eleven institutional representatives of the nineteen initially agreed to assist with the study. In addition to Duquesne University IRB approval, IRB approval was granted by the other ten institutions; however, only nine of those participated; eight participated in the comprehensive study and one institution's students were used for reliability assessment and instrument validation assessments only, because the primary investigator worked at that institution. To reduce any potential bias or to unduly influence the study outcomes, Waynesburg's students and CIs were used only for the reliability study, and their data were excluded from other parts of the study. Four institutions did not participate for various reasons including institutional representative (IR) changes, clinical education experiences were initiated prior to IRB approval, the required time between the onset and post experience was not available during the current clinical education experience, and a change of interest from an IR who originally agreed to participate but who later declined

Because the primary investigator worked at Waynesburg University, it was decided that to reduce any potential bias or to unduly influence the study outcomes, Waynesburg students and CIs were used only for the reliability study, and their data were excluded from the pilot study. Also to decrease bias, the Duquesne IR was not the Program Director who was involved in this study as the primary investigator's dissertation chair. As a result, 210 athletic training students from eight participating institutions were solicited to participate in the study; 121 (58%) of the Athletic Training students at those institutions chose to participate in this study. The CIs of each participating student then was solicited to participate in the study. Each student participating in the study completed an informed consent form, demographic survey and the ATS Perception of the Clinical Instructor Supervision Response Survey (S-PS).

Table 4.1 Athletic trainer student demographic information

n=121

Gender	Males	37 (31%)
	Females	84 (69%)
Median Age		21 (Range 19-30)

To be eligible for participation in this study, the students had to be involved in supervised clinical education experiences. Table 4.3 describes the sample's levels of higher education and the number of clinical experiences completed prior to the time the survey administration. Although the majority of the students completed 3 or more years of higher education, only half of the sample completed four or more clinical experiences prior to the survey.

Table 4.2 Academic and clinical level of ATS

n=121

# of academic years completed	1	5 (4%)
	2	32 (27%)
	3 or more	84 (69%)

# of clinical experiences completed prior to survey	0-1	24 (20%)
	2-3	40 (33%)
	4-5	23 (19%)
	6-8	6 (5%)
	9+	23 (19%)
	Not answered	5 (4%)

The Clinical Instructor survey (CI-S) was distributed to the CIs of the 121 students who agreed to participate in the study. 23 CIs (22%) completed and returned both rounds of surveys. Three of the CIs who participated supervised more than one ATS and completed a survey for each student, for a total of 27 CI surveys were returned and used for the study.

Table 4.3 Demographics for Clinical Instructors

n=23

Gender	Males	9 (39%)
	Females	14 (61%)
Median Age		33 (Range 22-51)

Most of the CIs completed certification eligibility through a NATA-approved or CAAHEP/CAATE-accredited AT education program, and 65% of the sample had 4 or more years of experience as a CI. Half (52%) of the CI sample had teaching experience other than as a CI: 45% were CPR and First Aid instructors, and two had teaching credentials. The majority (69%) of the CIs completed formal CI training, even though it was not required by the CAATE for them to be CIs.

The average estimated number of athletes/patients for whom the CIs provided athletic training services on a daily basis during the fall 2012 season while also supervising athletic training students was 50 (range 4-100), reflecting the time commitment for the primary job duties of the CIs. Along with the primary job

responsibilities and supervising AT students, 52% of the CI sample also supervised others while supervising AT students. Most of these were student managers for athletics.

Leadership and supervisory roles occur outside of the workplace. The sample of CIs demonstrated that, during the past six years, 39% of the sample supervised others (all ages) in activities such as scout leader, Sunday school teacher or camp counselor. 43% of the sample had responsibilities for the day to day rearing of children for a time frame of more than one year.

To determine if students had opportunities to utilize critical thinking skills outside of their academic programs, four questions regarding the students' employment and service activities were included on the student demographic survey. Table 4.4 describes the activities outside of education in which the students participated.

Table 4.4 Employment and Organization participation of ATS

n=121

Employment in last 5 years	
Employed full time	0
Employed part time	113 (92%)
Not employed	8 (8%)
Member of service organization in last 5 years	
Member of AT student organization	100 (84%)
Member of other service organization	60 (49%)
Leader of service organization in last 5 years	
Leader of AT student organization	45 (37%)
Leader of service organization	20 (17%)

The final question of the student demographic survey was designed to determine the students' self-perceived levels of critical thinking. The students were given the critical thinking definition used for the purpose of this study. "Critical thinking is purposeful, evaluative, and reflective thinking that explicitly aims at well-founded judgment, in an attempt to determine the true worth, merit, or value of something."[16] Table 4.5 describes the self-perceived critical skill levels of the AT students.

Table 4.5 ATS self-perceived critical thinking skills

n=121

Difficulties with educational and employment related demands for reflective problem-solving and reflective decision-making.	1 (1%)
Potential for challenges when engaged in reflective problem-solving and reflective decision-making	27 (22%)
Consistently able to engage in reflective problem-solving and reflective decision-making	69 (57%)
Confident being advanced at engaging in reflective problem-solving and reflective decision-making.	22 (18%)
Not answered	2 (2%)

To further examine the critical thinking skills of AT students and their CIs supervision response to those skills during supervised clinical education experiences, the following research was conducted.

Analysis of Research Questions

Research Question 1

What are the critical thinking skill levels of the ATSs' and how do they change during the clinical education experiences?

Hypothesis 1: There will be changes in the critical thinking skill levels of the ATSs over time (traditional fall clinical education experience).

Ho: Critical thinking skills do not change over time.

The California Critical Thinking Skills Test (CCTST) was used for data analysis of this question. Four of the participating institutions were selected using a stratified convient sampling technique, (two NCAA Division I - one each from SE and SW PA; two NCAA Division II - one each from NW PA and SW PA) to provide the sample used for analysis of this question. 52 athletic training students completed the Onset CCTST (R1), and 36 completed the End Experience (R2); therefore, only 36 students' findings were used to compare onset to end experience of the CCTST. Examination of CCTST Total Scores in relation to other external criteria and published research supported the use

of cut scores as indicators of likely performance.[17] Categories for these scores range from superior to not manifested.

Table 4.6 Descriptions of score for CCTST Total scores[17]

Superior: This result indicates critical thinking skill that is superior to the vast majority of test-takers. Skills at the superior level are consistent with the potential for more advanced learning and leadership.
Strong: This result is consistent with the potential for academic success and career development.
Moderate: This result indicates the potential for skills related challenges when engaged in reflective problem-solving and reflective decision-making associated with learning or employee development.
Weak: This result is predictive of difficulties with educational and employment related demands for reflective problem-solving and reflective decision-making.
Not Manifested: This result is consistent with possible insufficient test-taker effort, cognitive fatigue, or possible reading or language comprehension issues.

Although different, the total critical thinking (CT) scores forthe tests at both the onset and end of clinical experience resulted in moderate scores, indicating the sample "had potential for skills related challenges when engaged in reflective problem-solving and reflective decision making associated with learning or employee development".[17]

CCTST results were further analyzed using additional scale scores for each critical thinking sub-category (analysis, inference, evaluation, inductive and deductive reasoning). These cut scores corresponded to descriptions of Not Manifested, Moderate or Strong (Table 4.7). The sample score for the categories for the onset and end of experience test also fell within the moderate level of CT. Although there was a decrease in each of the mean scores from onset administration (R1) to end administration (R2), the mean scores remained at the moderate level of CTS.

Data analysis using Pearson's Correlation Coefficient (2 tailed) and paired t-test were performed to identify differences and similarities in scores.

Table 4.7 Comparison of CCTST results onset (R1) and end (R2) clinical education experience

(n=52)

PAIR		MEAN	CORRELATION		PAIRED T TEST (t) df=51
1	Analysis R1	3.62	-.156		5.091 *
	Analysis R2	1.92			
2	Inference R1	7.98	-.413*		3.638 *
	Inference R2	5.10			
3	Evaluation R1	4.67	-.152		4.701 *
	Evaluation R2	2.52			
4	Induction R1	9.38	-.341*		4.596 *
	Induction R2	5.52			
5	Deduction R1	6.88	-.223		4.164
	Deduction R2	4.02			
	Overall R1	16.27	-.324*		4.657 *
	Overall R2	9.54			

Critical value (t) 2.01 $p < .05$.

The mean of the overall CTS test demonstrated a statistically significant decrease for the end of clinical experience test. There also were significant differences in the means for all categories of CTS except deduction. These comparisons then were refined and compared to determine whether year in school impacted the findings. (Table 4.8 and Table 4.9)

Table 4.8 Comparison of onset and end CCTST results of ATS who have completed one or two years of higher education over time

(n=11)

PAIR		MEAN	CORRELATION		PAIRED T TEST (t) df=10
1	Analysis R1	3.82	-.406		2.28*
	Analysis R 2	2.36			
2	Inference R1	7.91	.247		1.63
	Inference R2	6.18			
3	Evaluation R1	5.18	-.015		1.84
	Evaluation R2	3.37			
4	Induction R1	9.82	.042		1.78
	Induction R2	7.36			
5	Deduction R1	7.09	-.06		1.95
	Deduction R2	4.91			
	Overall R1	16.91	.005		2.11
	Overall R2	12.27			

$p<.05$.

The students who completed one or two years of higher education showed a significant decrease in their mean scores. There were no significant differences in the overall CT

scores or in the categories of inference, evaluation, induction and deduction. Based upon these findings, the null hypotheses were accepted for ATSs who completed one or two years of higher education.

Table 4.9 Comparison of onset and end CCTST results of ATS who have completed three or more years of higher education over time

(n=23)

PAIR		MEAN	CORRELATION (r)		PAIRED T TEST (t) df=22
1	Analysis R1	3.43	.553*		2.23*
	Analysis R2	2.78			
2	Inference R1	8.13	.733*		1.43
	Inference R2	7.52			
3	Evaluation R1	4.61	.350		2.30*
	Evaluation R2	3.43			
4	Induction R1	9.22	.509*		1.98
	Induction R2	7.38			
5	Deduction R1	6.96	.742*		2.40*
	Deduction R2	5.87			
	Overall R1	16.17	.734*		2.82*
	Overall R2	13.74			

p<.05.

The AT students who completed three or more years of higher education showed a statistically significant decrease in the Overall CT skills, as well as in the categories of analysis, evaluation, and deduction. This group also demonstrated a stronger relationship between the onset and end test experiences for all paired categories except evaluation. Based upon these findings, the null hypotheses **were** rejected for the ATSs who completed three or more years of higher education.

Table 4.10 Comparison of CCTST results of AT students who have completed one or two years (1-2) and three or more years (3+) of higher education

(n=22)

Pre-test			**Post-test**	
PAIR	PAIRED T TEST (t) df=21		PAIR	PAIRED T TEST (t) df=21
Analysis 1-2	-.375		Analysis 1-2	-1.345
Analysis 3+			Analysis 3+	
Inference 1-2	-.372		Inference 1-2	-1.332
Inference 3+			Inference 3+	
Evaluation 1-2	.392		Evaluation 1-2	-.257
Evaluation 3+			Evaluation 3+	

Induction 1-2	.245		Induction 1-2	-.607
Induction 3+			Induction 3+	
Deduction 1-2	-.486		Deduction 1-2	-1.559
Deduction 3+			Deduction 3+	
Overall 1-2	-.156		Overall 1-2	-1.063
Overall 3+			Overall 3+	
	p<.05.			p<.05.

Although the means for the students with three or more years of higher education were higher than those of the students with 1-2 years of higher education, the null hypothesis that there were no differences between the groups was accepted at the .05 alpha level for all pairs and in both onset and end clinical experiences. For both groups of students, the total overall critical thinking skill level remained at the moderate level for the onset and end tests.

Based upon these findings, the hypothesis that there will be changes in the critical thinking skills of the athletic training students over time was accepted, demonstrated by the negative significant change in the overall CCTST results.

Research Question 2

Is there a relationship between the CIs' self-perceptions of their supervision responses and the ATSs' perceptions of CIs' supervision responses?

Hypothesis 2: The CIs and the ATSs will perceive the characteristics of the CIs supervision responses in a consistent manner with the ATS levels of critical thinking skills.

Ho_1: Mean of the survey results of the perceived characteristics of the CIs supervision responses of onset-clinical experiences will not be consistent with those end-clinical experiences.

Ho_2: Mean of survey results of the perceived characteristics of the CIs supervision responses of the ATSs will not be consistent with those of the CIs.

Statistics used for this analysis included a series of correlations of both parametric (Pearson's) and nonparametric (Kendall's Tau B, Spearman's rho) measures, as well as paired t-test (2 tailed).

Table 4.11 Change of ATS and CI perception of CI supervision response over time

84 questions from the survey n=121ATSs, 23 CIs

PAIR	MEAN	CORRELATION				PAIRED T TEST (t) df=83
		Pearson	Kendall's Tau_b	Spearman's rho		
ATS Survey R1	2.28	.461*	.356*	.440*		-5.51*
ATS Survey R2	2.67					
CI Survey R1	2.66	.283*	.229*	.322*		-1.84
CI Survey R2	2.87					

p<.05.

As shown in Table 4.11, correlation coefficients demonstrated significance in the relationships between the onset and post clinical experience survey results for both the ATSs and CIs. Although a less powerful relationship was demonstrated for the CIs' survey results, the relationship was significant. There was a significant change perceived by the ATSs of the responses of the CIs' supervision over time. The students perceived that the CI supervision responses to their levels of critical thinking allowed them to develop more self-awareness, motivation and autonomy over the course of their clinical education experiences. The data reflected no significant changes in the CIs' perceptions of their supervision responses over this same time.

Table 4.12 Comparison of ATS and CI perceived supervision response pre and post clinical education experience

84 questions from the survey n=121ATSs, 23 CIs

PAIR	MEAN	CORRELATION				PAIRED T TEST (t) df=83
		Pearson	Kendall's Tau_b	Spearman's rho		
ATS Survey R1	2.28	.227*	.157*	.210*		-3.44*
CI Survey R1	2.66					

ATS Survey R2	2.67	.879*	.683*	.859*		-4.62*
CI Survey R2	2.87					

p<.05.

The CIs' self-perceived supervision responses to the ATSs' levels of critical thinking were statistically significantly different (higher) than the students' perceptions at both the onset and end of the clinical education experiences. The CIs perceived that they allowed the students more self-awareness, motivation and autonomy than the students perceived. The correlation coefficient demonstrated positive relationships between the ATSs' and the CIs' supervision responses to the students' critical thinking skills. There was a more powerful relationship demonstrated at the end of the clinical education experiences.

Table 4.13 Comparison of ATS and CI perceived supervision responses over time for students who completed 1-2 years of higher education

84 survey questions

PAIR	MEAN	CORRELATION/SIG.		PAIRED T TEST (t) df=83
		Pearson		
ATS Survey R1	1.99	.725*		-6.66*
ATS Survey R2	2.37			
CI Survey R1	2.93	.929*		-1.65
CI Survey R2	2.99			

p<.05.

Table 4.14 Comparison of ATSs and CIs perceived supervision responses of CIs for students who completed 1-2 years of higher education

84 survey questions

PAIR	MEAN	CORRELATION/SIG.		PAIRED T TEST (t) df=83
ATS Survey R1	1.99	.618*		-12.33*
CI Survey R1	2.93			
ATS Survey R2	2.37	.719*		-9.27*
CI Survey R2	2.99			

p< .05.

The results for the surveys of the students who completed one-two years of higher education were similar to the overall results. The correlation coefficient reflected a

strong relationship between the perceived supervision responses of the CIs to the ATSs' critical thinking skills over time. The CIs did not perceive differences in their supervision responses over time, but the ATSs did perceive there were a differences. The CIs consistently demonstrated a higher mean than did the ATSs, reflecting that the CIs perceived that they gave their students more opportunities to demonstrate self-awareness, motivation and autonomy while performing athletic training skills.

Table 4.15 Comparison of ATSs' and CIs' perceived supervision responses over time for students who completed 3 or more years of higher education

84 survey questions n= 82 ATS

PAIR	MEAN	CORRELATION/SIG.		PAIRED T TEST (t) df=83
		Pearson		
ATS Survey R1	2.41	.760*		-6.99*
ATS Survey R2	2.78			
CI Survey R1	2.71	.958*		-4.224*
CI Survey R2	2.81			

p< .05.

Table 4.16 Comparison of ATSs' and CIs' perceived supervision responses of CIs for students who completed 3 or more years of higher education

84 survey questions

PAIR	MEAN	CORRELATION/SIG.		PAIRED T TEST (t) df=83
ATS Survey R1	2.41	.680*		-4.352*
CI Survey R1	2.71			
ATS Survey R2	2.78	.891*		-.745
CI Survey R2	2.81			

p< .05.

For both subgroups of students defined by level of higher education, there was evidence of positive relationships between the pre and post-experience survey means. There also was evidence of a positive relationship between the AT student survey means and the CI survey means. Means of the survey responses increased from R1 to R2 for both the CIs and the ATSs, although there were not statistically significant increases of the CI responses for the lower level students. This reflects that the CIs did not perceive

that their supervision responses to the students' CT skills did not change over the course of the clinical experience for that group. The mean of the CIs' supervision responses were higher than that of the AT students for both rounds of surveys. There were statistically significant differences between survey responses for the lower level students for R1 and R2. The responses for the 3+years of higher education students were significantly different for R1, but not for R2.

Table 4.17 Comparison of ATSs' perceived supervision responses of CIs for students who completed 1-2 years of higher education and those who completed 3 or more years of higher education

PAIR	MEAN	CORRELATION		PAIRED T TEST (t) df=83
ATS Survey R1 1-2	2.04	.890*		-13.15*
ATS Survey R1 3+	2.47			
ATS Survey R2 1-2	2.37	.890*		-10.82*
ATS Survey R2 3+	2.78			

p< .05.

There was a relationship between the students' perception of the CIs' supervision response to their critical thinking skill levels at both the onset and end clinical education experiences. The students who completed three or more years of higher education perceived the CI's supervision responses to their critical thinking skills as allowing them more autonomy and encouraging them to be more self- aware and motivated during their clinical education experience.

Table 4.18 Comparison of CIs' perceived supervision responses of CIs for students who completed 1-2 years of higher education and those who completed 3 or more years of higher education

PAIR	MEAN	CORRELATION		PAIRED T TEST (t) df=83
CI Survey R1 1-2	2.77	.990*		4.93*
CI Survey R1 3+	2.71			
CI Survey R2 1-2	2.99	.890*		4.05*
CI Survey R2 3+	2.81			

p< .05.

The data reflected statistically significant differences in the CIs' self-perceptions of their supervision responses when comparing the students who completed 1-2 years of

higher education with those who completed three or more years of higher education. The CIs' self-perception of their supervision levels showed them giving less autonomy, self-awareness and motivation at both the onset and end clinical education experience time.

Table 4.19 Comparison of ATS and CIs' perceived supervision responses of CIs for students who completed 1-2 years of higher education and those who completed 3 or more years of higher education

PAIR	MEAN	CORRELATION		PAIRED T TEST (t) df=83
ATS Survey R1 1-2	2.04	.845 *		-15.08*
CI Survey R1 1-2	2.77			
ATS Survey R1 3+	2.47	.898*		-5.45*
CI Survey R2 1-2	2.99			
ATS Survey R2 1-2	2.37	.719*		-9.27*
CI Survey R1 3+	2.71			
ATS Survey R2 3+	2.78	.891*		-.745
CI Survey R2 3+	2.81			

p< .05.

Table 4.20-4.22 present comparisons of the relationships of the learning constructs of motivation, self-awareness, and autonomy. Using the survey's Table of Specification, each construct was assessed with 28 questions on the survey.

Table 4.20 Comparison of ATSs' perceptions of the level of CI supervision response constructs

n=121

PAIR	MEAN	CORRELATION		PAIRED T TEST (t) df=27
Motivation R1	2.08	.976*		-14.78*
Motivation R2	2.47			
Self-Awareness R1	2.45	.972*		-11.58*
Self-Awareness R2	2.75			
Autonomy R1	2.51	.973*		-11.06*
Autonomy R2	2.78			

p<.05.

Table 4.21 Comparison of CIs' self-perception of level of CI supervision response constructs

n=23

PAIR	MEAN	CORRELATION		PAIRED T TEST (t) df=27
Motivation R1	2.20	.966*		-2.98*
Motivation R2	2.32			
Self-Awareness R1	3.03	.963*		-1.286

Self-Awareness R2	3.08			
Autonomy R1	3.16	.971*		-1.937**
Autonomy R2	3.22			

p<.05. **p=.063

There was a strong relationship between the perceived CIs' supervision responses for the onset and end clinical education experiences from both the ATSs and the CIs. There was also a statistically significant change over time for all constructs by the ATS demonstrating a perception by the student that while the student was supervised doing athletic training skills, the CI allowed them to develop increased motivation, self-awareness and autonomy. The CIs' self-perception responses demonstrated that there was a change over time in the amount of motivation given to the students during the clinical education experiences; no change in self-awareness, and a trend toward a change over time in the level of autonomy given to the student during the clinical education experience. This data demonstrated that the CIs did not perceive that they changed the type of supervision they provided over time. The students did perceive that the CIs changed their supervision responses over time.

Table 4.22 Comparison of AT student and CI responses pre-clinical education experience

n=28 questions

	Pre-Clinical Experience		
PAIR	MEAN	CORRELATION	PAIRED T TEST (t) df=27
Motivation ATS	2.08	.903*	-1.827
Motivation CI	2.20		
Self-Awareness ATS	2.48	.929*	2.473*
Self-Awareness CI	2.32		
Autonomy ATS	2.45	.862*	-9.502*
Autonomy CI	3.03		

p< .05.

The data reflected that at the onset of clinical education experiences there was a strong relationship between the ATSs' and the CIs' perceived CI supervision responses for all three constructs of supervision. There were statistically significant differences between the ATSs' and CIs' perceptions of the CI supervision responses in the construct of self-awareness and autonomy along with a trend reflected (p=.07) in the construct of motivation. At the time of this study, the students felt that the CIs encouraged them to develop more self-awareness than what the CIs' self perceptions reflected.

Table 4.23 Comparison of AT student and CI responses post-clinical education experience

n=28 questions

	Post-Clinical Experience		
PAIR	MEAN	CORRELATION	PAIRED T TEST (t) df=27
Motivation ATS	2.75	.897*	-5.754*
Motivation CI	3.08		
Self-Awareness ATS	2.51	.883*	-12.813*
Self-Awareness CI	3.16		
Autonomy ATS	2.78	.895*	-8.588*
Autonomy CI	3.22		

p< .05.

At the end of clinical education experiences, there remained a strong relationship between the ATSs' and CIs' perceptions of supervision response constructs. There also were statistically significant differences between the perceptions of the ATSs and the CIs supervision responses to the ATSs' levels of critical thinking with the CIs' perceptions that they allowed for improved motivation, self-awareness and autonomy during clinical experiences than what the students perceived. Based upon these data , the null hypotheses was accepted.

Research Question 3

Are the CIs' supervision responses consistent with the ATSs' critical thinking skill levels and are the critical thinking skill levels consistent with the CIs' supervision responses?

Hypothesis 3: The critical thinking skill levels of the ATSs and the levels of the CI supervision responses will be consistent with each other.

Ho: Supervision levels will not be consistent with the CT skills of ATS

Because the data from CCTST were interval, and the data from the supervision surveys were ordinal, the CCTST data were converted to ordinal data in order to compare the CCTST means to the survey means. Table 4.24 describes how this was done for both the overall CT score and for each CT category.

Table 4.24 Conversion of Overall CCTST score to ordinal data

CCTST Category cut-off score	CCTST Interpretation	Converted Score	Supervision Survey score	Supervision Survey Interpretation
0-7	Not Manifested	0	0	Not Observed
8-12	Weak	1	1	Almost Never
13-18	Moderate	2	2	Sometimes
19-24	Strong	3	3	Often
25 or higher	Superior	4	4	Almost Always

Table 4.25 Conversion of CCTST Category scores to ordinal data

CCTST Category cut-off score					CCTST Interpretation	Converted Score	Supervision Survey score	Supervision Survey Interpretation
Analysis	Inference	Evaluation	Inductive Reasoning	Deductive Reasoning				
0-2	0-5	0-3	0-5	0-5	Not Manifested	0	0	Not Observed
							1	Almost Never
3-4	6-11	4-7	6-11	6-11	Moderate	2	2	Sometimes
							3	Often
≥5	≥12	≥8	≥12	≥12	Strong	4	4	Almost Always

Table 4.26 Comparison of the overall perceived supervision responses of the CIs to the CT skill levels of the ATSs

PAIR	MEAN N=52/ 36	CORRELATION/SIG.			PAIRED T TEST (t) df=51/35
		Pearson	Kendall's Tau_b	Spearman's rho	

	CI Survey R1	2.77	-.131	-.083	-.104	3.436*
	CCTST R1	2.15				
	ATS Survey R1	2.3	-.244	-.167	-.214	1.181
	CCTST R1	2.15				
	CI Survey R2	2.87	.045	.000	-.007	5.912*
	CCTST R2	1.69				
	ATS Survey R2	2.73	-.082	-.059	-.083	5.691*
	CCTST R2	1.69				

p< .05.

The data suggested no evidence of a relationship between the supervision responses of the CIs to the CCTST results. At the onset of the clinical experience, the ATSs' perceptions of the CIs' supervision responses were at the level of the students' critical thinking skills. This changed over time, and by the end of the clinical experiences, the ATSs' and the CIs' perceptions of the supervision responses demonstrated a perception of a higher level of critical thinking skills than the end of expereince test of CCTST results demonstrated. The students and the CIs demonstrated a perceived supervision response of the students' critical thinking levels increasing over time, but the CCTST did not demonstrate a similar increase. These results reflected that perceived supervision that occurred during clinical education experiences was at a higher level than the CT skills of the students.

Table 4.27 Comparison of Supervision and CTS results for students Completing 1-2 years of higher education

PAIR		MEAN	CORRELATION			PAIRED T TEST (t) df=10
			Pearson	Kendall's Tau_b	Spearman's rho	
1	CI Survey R1	2.44	.019	.025	.043	.776
	CCTST R1	2.18				
2	ATS Survey R1	2.14	-.045	-.073	-.043	-.132
	CCTST R1	2.18				
3	CI Survey R2	2.56	.194	.232	.275	2.92*
	CCTST R2	1.45				
4	ATS Survey R2	2.11	.431	.316	.372	2.15*
	CCTST R2	1.45				

p< .05.

Data reflected in Table 4.27 demonstrated no relationship between the perceived supervision responses of the CIs to the CCTST results of students who completed only 1-2 years of higher education. At the onset of the clinical education experiences, the perceptions of the level of supervision provided by the CIs were not different than the CT skill levels demonstrated by the CCTST. At the end of the clinical education experiences, there were statistically significant differences between perceived supervision responses' to the students CT skills and the CCTST results. This presented conflicting data demonstrating that the CCTST tool demonstrated CT skills of the student decreased while the supervision response findings demonstrated that the CT skills used during athletic training specific situations increased, as the CIs encouraged increases in the supervision constructs of motivation, self-awareness and autonomy.

Table 4.28 Comparison of Supervision and CTS results for ATS completing 3+ years of higher education

PAIR		MEAN	CORRELATION/SIG.			PAIRED T TEST (t) df=22
			Pearson	Kendall's Tau_b	Spearman's rho	
1	CI Survey R1	2.72	-.398	-.283	-.355	1.83
	CCTST R1	2.09				
2	ATS Survey R1	2.62	-.393/	-.317	-.415*	1.77
	CCTST R1	2.09				
3	CI Survey R2	2.87	-.490*	-.318	-.416*	3.48*
	CCTST R2	1.70				
4	ATS Survey R2	2.84	-.289	-.152	-.211	4.50*
	CCTST R2	1.70				

p< .05.

The results for the students who completed 3 or more years of higher education were similar to those of other students. Although there were no negative relationship shown in the correlation, there was a trend toward a relationships between the mean scores of the CIs' supervision survey and the CCTST results. There is a definite

difference in the perceptions of supervision responses to the students' CT skills and the CCTST results.

The data suggested that the null hypothesis that the supervision response of the CI was not consistent to the CT skills of the ATS should not be accepted at the time of the onset of clinical education experience. At the end of the clinical education experiences there were statistically significant differences in the perceptions of the ATSs and the CIs to the CIs' supervision responses and the levels of CT skills of the ATS so the null hypothesis was accepted in this instance.

Research Question 4

Was there a relationship between the change of the ATSs' and CIs' perceptions of the CIs' supervision responses and the changes in the ATSs' critical thinking skill levels?

Hypothesis 4a: The change in the CIs' supervision responses between onset and end clinical education experiences will be consistent with the changes in the ATSs' critical thinking skill levels.

Hypothesis 4b: The changes in the ATSs' supervision responses between onset and end clinical education experiences will be consistent with the changes in the ATSs' critical thinking skill levels.

Ho_1: The changes in the CIs' self-perceived supervision responses to the students' levels of critical thinking will not be consistent with the changes in the students' critical thinking skills.

Ho_2: The changes in the AT students' perceived supervision responses of the CIs to the students' levels of critical thinking will not be consistent with the changes in the students' critical thinking skills.

Analysis of this question compared the changes in the results of the supervision surveys with the changes in the results of the CCTST. The data analysis involved specific matched pairs for the supervision surveys which indicated that the means of differences between onset and end clinical education experiences results were used.

Table 4.29 Mean of the differences

PAIR	n	MEAN OF ROUNDS	Correlation (Pearson)	df	PAIRED T TEST
CCTST R1 & R2	52	16.27/9.54	-.324	51	4.657*
ATS Survey R1 & R2	100	2.42/2.67	.605	99	-3.69*
CI Survey R1 & R2	23	2.80/2.87	.732	22	-.83

p< .05.

The data confirmed a strong relationship between the ATSs' and CIs' perceptions of the CIs' supervision responses to the ATSs' levels of critical thinking over a period of time. There was a significant change demonstrated over time of the AT's' perceptions of the CIs' supervision responses to the students' critical thinking skills during the clinical education experience. There was no change over time in the CIs' self-perceived supervision responses to the students' critical thinking skill levels.

Table 4.30 Mean of the differences

PAIR	MEAN OF DIFF	Correlation (Pearson)	PAIRED T TEST
CCTST R1 & R2 ATS Survey R1 & R2	-.73	-1.00	-1.49
CCTST R1 & R2 CI Survey R1 & R2	-1.02	-1.00	-2.55

p< .05.

Although there was a statistically significant change over time in the CCTST and in the Supervision Survey results, there were no statistically significant differences between the means of those differences. There was a high negative correlation between

the two differences. The hypothesis that the change in the supervision survey was consistent with the change in the critical thinking skills of the ATS as measured by the CCTST was accepted. These results demonstrated that the S-PS and CI-S was a valid tool for assessing not only the supervision response of the CIs in this sample, but also the CT levels of ATSs in this sample. The CCTST results showed that although there was a statistically significant decrease in the CCTST results over time the student remained within the moderate level of CTS. As demonstrated by the results of the S-PS and the CI-S, the supervision responses of the CIs demonstrated that there was an increase in CTSs used by the students during specific athletic training skills over time during a fall clinical education experience.

CHAPTER 5: Discussion

Introduction

The critical thinking levels of entry-level athletic trainers have been a concern of athletic training educators since the formalization of athletic training education in the 1970s.[47] The volume and depth of the didactic and clinical requirements in athletic training education have increased over the past 30 years resulting in very knowledgeable young professionals who have been exposed to a variety of clinical experiences. Yet, there has been an associated increase in concern from not only the AT educators, but also more recently from the practicing clinicians, about the clinical decision making skills, confidence, and critical thinking abilities of entry-level athletic trainers. While this concern has grown, there has been very little study to validate the empirical conclusions made by the more experienced professionals. In response to these concerns and lack of available evidence to support the concerns, this study examined the critical thinking abilities of a small sample of athletic training students while also examining the impact of clinical education experiences on those abilities. More exactly, this pilot study examined both the critical thinking skills of a small sample of athletic training students and the perceived supervision responses of their CIs to the students' levels of thinking as measured by the California Critical Thinking Skills Test (CCTST). This study then examined the relationship between the CTS and supervision responses of the CIs.

This study found that this sample of athletic training students demonstrated a moderate overall critical thinking skill level. Although there was a decrease in the overall CCTST score over time, the score did not fall below the moderate critical thinking level. The study also found that the students who had completed 3 or more years of higher education and the students who completed 1-2 years of higher education demonstrated

the same level of CTSs at both the onset and the end of the clinical education experiences.

The study also found this sample of athletic training students perceived statistically significant changes in the CIs' supervision responses to the students' levels of thinking over the period of one clinical education experience. The ATSs perceived increases in the amount of autonomy given to the ATSs by the CIs during their clinical education experiences. The students also perceived an increase in their own motivation and self-awareness occurring during those clinical education experiences. Although the students' results reflected perceived changes in the CIs' supervision responses over time, the students' levels of self-awareness and motivation during the clinical education experiences remained unchanged. The CIs' onset and end of clinical experience evaluations remained consistent in their perceptions of the amount of autonomy given to the students during clinical education. The CIs consistently perceived that they gave the students greater amounts of autonomy during the clinical experience, as well as provided higher levels of motivation and encouraged greater self-awareness in the students than what the students perceived.

Findings and Discussion

When examining the critical thinking skills (CTS) of the athletic training students using the CCTST, there were statistically significant decreases in overall critical thinking skills over one clinical education experience, with decreases also demonstrated in all subcategories of the critical thinking skills test . A closer look revealed that the students who completed three or more years of higher education (older students) demonstrated a significant decrease in their overall scores, as well as decreases in scores in the

subcategories of evaluation, induction, deduction and analysis. The students who completed only 1-2 years of higher education (younger students) demonstrated no statistically significant changes in their overall critical thinking skills and demonstrated decreases only in scores only in the category of analysis. These findings were consistent with the critical thinking literature that identified relatively weak tendencies toward CT in ATSs[68]and with other literature that identified inconsistent findings[110,114] or no changes in CTS[110,114] over one semester for PT and OT students. Although limited research has demonstrated a change in critical thinking over a six week period[17], this study did not support those changes.

There were no statistically significant differences between the overall critical thinking skill scores when comparing the older and younger groups of students in the sample on either the onset or end clinical experience CCTSTs. These findings also differed from the limited literature that presented evidence that those students who were in the last years of their bachelor degrees demonstrated higher levels of critical thinking than students who were in their first or second years of higher education.[116,120,175,176] Results of the older students not demonstrating higher levels of critical thinking skills provided additional evidence to support the commonly held concern that entry-level athletic trainers may not have the critical thinking skills necessary for successful clinical decision making when they graduate and enter into autonomous practice.

The findings suggest that this sample of students either did not have enough stimulation to improve their clinical thinking skills during their clinical experiences, or they were initially challenged by and learned their CIs' procedures and the needs of their patient populations, but then became more rote in their activities and skills. These rote

skills could include evaluation techniques of common injuries or conditions seen in those experiences or the types of therapeutic exercises that their CIs preferred, reinforcing what they did learn, but not necessarily challenging the students to consistently integrate that learning into solving new or different problems. Integration may have forced the students to use their critical thinking skills to advance to higher levels of thinking. The behaviors consistent with the behaviors of students who think concretely and are able to do tasks assigned, repeat tasks that they have performed successfully, and begin to interpret events that lead to the needs of the tasks.[20] The students did not demonstrate advancement to the level of Abstract Conception thinking where there is an understanding of the relationship among events and the reflection of what has been done to notice differences and applications of needs.[20]

At the beginning of the clinical education experiences, the students were asked to reflect on their abilities to think critically, using the definition of critical thinking as "purposeful, evaluative, and reflective thinking that explicitly aims at well-founded judgment, in an attempt to determine the true worth, merit, or value of something."[16]75% of the students in this sample responded they were confident or consistent (strong or superior level of CTS) in their abilities to engage in reflective problem-solving and decision making. The remaining 25% of students responded that they recognized potential (moderate level of CTS) ability to engage in reflective problem-solving and decision making. These student self-reflections are at higher levels than what the CCTST results showed; an overall moderate critical thinking skill level for the group that indicated the "potential for skills-related challenges when engaged in reflective problem-solving and reflective decision-making associated with learning or professional

development compared to the norms of four year college students."[17] Although there was a statistically significant decrease in the overall critical thinking skill level score over time, the score remained at the moderate level. These results indicate that the students in this sample perceived that they were functioning at higher critical thinking skill levels than what was revealed through the CCTST.

To address this finding, a closer look at supervision during clinical education experiences was done. The sample of athletic training students and their clinical instructors completed individual surveys (S-PS and CI-S) to determine the perceived supervision responses of the CIs to the students' level of thinking. The results of the surveys revealed a strong relationship between the CIs' and ATSs' perceptions of the CIs' supervision responses to the students' level of critical thinking; they agreed that the students functioned differently at the beginning and end of clinical experiences. However, there were significant differences between the students' and the CIs' perceptions of those CI supervision responses. While the data reflected significant changes over time of the students' perceptions of the CIs' supervision responses to their critical thinking skills, the data did not show a significant change in the CIs' self-perceptions of their supervision responses when compared to the students' critical thinking skills over the course of a fall clinical experience.

The findings from this study did not reflect that the CIs adapted their supervision responses to the levels of CT of the students. Even with the perceived changes of the students' perceptions of CIs' supervision responses, neither the students' nor the CIs' survey results reflected that the supervisors adapted their supervision responses to level that encouraged the students to use more complex thinking skills, have more tolerance for

ambiguity, and/or require that their supervisory environments to become less structured and more supportive.[12,18,158] While there are many ways for students to be guided to use more complex thinking skills, one method would be for the CIs to challenge students in their thinking by not only allowing them to complete the skills they have been instructed in, but then also to provide graded autonomy opportunities for students to utilize those skills in new and different situations when the CIs will not intervene unless there is a danger for the patient or the students. To advance their critical thinking abilities, students should not only be required to do skills they are comfortable and confident with, but also those that they are not as confident in or might require them to problem solve, taking previous knowledge and apply it to new situations to address their patients' needs The current supervision model can and appears to currently work for the younger students with less knowledge and clinical education experience in this sample, but the older students may need to have more opportunities to do more. The students need to initiate patient contacts and get as far as they can with each patient care situation without interventions from the CIs. When the CIs intervene, they should challenge the student to continue patient care by asking questions, have the students reflect on previous learning, and provide new knowledge to the students when needed. This should be happening with all students in a continuum of learning based upon the students' knowledge, skills and ability.

One explanation for the CI not adapting their supervision responses to the ATSs' levels of thinking may be the work load of the CIs. The CI sample for this study had an average daily patient load of 50 patients, in addition to their responsibilities to supervise athletic training students. Half of the CI sample also supervised student managers at the

same time. The primary responsibility of the CIs remains patient care; however, when more responsibilities are added to that job, the CIs must determine their priorities. Providing clinical education experiences and adapting those experiences to meet the individual needs of each student may become a lower priority as the season's progress, schedules become busier, and patient responsibilities continue or increase.

The CAATE Standards address these types of concerns or conflicts during clinical education experiences.[177] The Standard require that the "number of students assigned to a CI/preceptor in each clinical setting must be of a ratio that is sufficient to ensure effective clinical learning and safe patient care."[177] CIs who must provide care for 15-50 patients daily and continue to have supervisory and educational responsibilities for 4-6 ATSs for clinical may be challenged to keep clinical experiences educational rather than work/service-related. If CIs have less students to supervise and educate, it may be easier for those CIs to provide challenging experiences and adapt their supervision responses to encourage students to take on higher levels of autonomy while caring for patients and to stimulate them to think more critically about their decisions/actions, by asking questions or challenging the students to provide rationales for their decisions.

Although to our knowledge there is no previous research in athletic training that examines the CIs' supervision responses to ATSs' abilities to think critically during clinical education, foundational research on supervision of psychology students recommended that "supervisors should adapt their supervision responses to the developmental needs of students, continually assessing and flexing their supervisory skills to match their students' changing knowledge."[18]Previous research supports that the

supervisors' responses to students should differ based upon the students' stages of development. Students at lower levels of CT development require more structure, whereas more advanced students are able to perform more complex thinking and benefit from less structured and more collegial supervisory environments.[18] This can be done by providing an environment that not only provides guided independence and graded autonomy but also an environment that requires students to be more reflective of what they do and how they do it during the clinical experiences. This situation may require the student to receive an increase in the amount of formative assessments in addition to the required summative assessments.

The goal of formative assessment is to monitor student learning and to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning. The summative assessment is to evaluate student learning at the end of an instructional unit, i.e. exams, final projects.[178] This formative process could include more reflective assignments, more challenging questioning by the CIs during the clinical experience, and/or more self-evaluations by students that are compared to CIs' evaluations throughout the clinical experiences. Formative assessment may help the student to identify their strengths and weaknesses and target those areas that need improvement. It also allows the CIs to recognize where the students are struggling and provide feedback to address problems more immediately.[178] Ongoing assessment and feedback should be given to the younger students in a more direct manner with more positive reinforcement, and the older students should receive feedback that challenges them to reflect on their actions and then challenge them to perform at higher levels in future situations.[4,13,41,42,50] This type of feedback will not only help the students improve

in their clinical reasoning, but also may help the CIs to build more confidence in the students' abilities and thereby building the students' confidence which may make it more likely that the CIs will give the students more autonomy during those clinical experiences.

By monitoring the students level of learning over the course of time, challenging them with questions and placing them in different learning situations, the students will be encouraged to take more responsibility for their decisions as well as provide them with the freedom to work though real life situations during the clinical experiences. Therefore, it would appear that if the CIs were more able to recognize and adapt their supervisory responses to the students' changing needs throughout the clinical experiences, there may be an increase in the critical thinking skill levels over that experience time. However, based upon the workloads and other administrative responsibilities of the current CIs, it is very difficult for the CI to meet the demands of clinical education supervision; it appears that it may be time to change the clinical education supervision model.

Implementation of the clinical supervision model for athletic training clinical education has changed from little or no supervision of the students to a direct supervision requiring a constant physical presence of the CI with an ability to intervene immediately. This occurred for various reasons including the students being used as a work force to provide athletic training services and the need for protection of the patients from injury. Rather than focusing on the pendulum being the entity of all or none for clinical education supervision, that the results of this study indicate that it may be more beneficial to think of a pendulum of supervision that could be determined for each student based upon that student's level of critical thinking for each situation. A student with new

knowledge may need to have close supervision while being allowed to treat the patient, while a student with more advanced knowledge should have less supervision and more autonomy while still being able to provide feedback and reflection about the care provided. This pendulum needs to be seen as a continuum rather than one with two ends. Graded supervision of the ATS in this sample should be determined on the level of thinking of each student and adapted by the CI throughout the clinical education experiences. The challenge of providing this graded supervision by the CI is the already heavy clinical workload of athletic trainers who are also CIs. Achieving the best clinical education experience for the students may require staffing alternatives.

One way to improve the clinical supervision model to further encourage of the opportunities for more graded autonomy for students is to create CI positions that are academic appointments with clinical responsibilities. Currently, many CIs in this sample have clinical appointments with little or no designated academic responsibilities or release time. For those CIs, student education is a secondary responsibility and commitment. Even the CI with the best intentions for student education may have difficulty dedicating the needed time to provide the highest quality of student education experiences.

This need for an academic clinical position could provide a rationale for the most recent changes in the 2012 CAATE Standards 22-24 for the requirement of a Clinical Education Coordinator (CEC) . [177]Two of the delineated responsibilities of a Clinical Education Coordinator are to assure appropriate student clinical progression and clinical evaluation.[177] These responsibilities can be met partly by having a CEC becoming more involved in the daily activities of the students' clinical education experiences. The CEC,

and/or designated academic-clinical personnel, can assist the CI with providing learning opportunities, reflection and feedback during the clinical education experiences. These responsibilities greatly increase the time requirements for the CEC/CI so may need to be completed by more than one individual or the CEC may need to have reduced teaching responsibilities to complete the supervision needs. The CEC/CI should not only be a competent educator, but also an experienced clinician whose clinical reasoning has advanced to that of an expert clinician. Both relevant medical knowledge and previous experience play central roles in successful clinical problem-solving and decision making while the clinical reasoning process advances and becomes a more automatic response, a clinician moves from novice to expert.[65] Because an expert clinician is able to string lines of inquiry and analysis together for patient management,[64] the expert clinician/educator is more likely to understand the process of breaking down the skills needed to successfully reason through patient management and relate them to the students' learning level. This in turn may allow the CEC/CI to guide the student to perform and learn more effectively during clinical education experiences. The CEC/CI can also discuss the students progress and learning levels with the students CI assisting with assessment of competence in skills. The CEC could work with the CIs in the clinical settings, much like the nursing clinical education model, being physically present to encourage the students to utilize higher levels of thinking during their clinical education experiences but having limited or no patient responsibilities. CECs should have a regular clinical presence so that he/she can focus on the ATSs' learning during clinical education experiences, encourage the CIs and ATSs to reflect upon the students thinking and decision processes, and encourages higher levels of thinking during clinical

experiences. The CECs also could take more active roles in assuring that not only the didactic educators, but also the clinical educators understand the importance of and encourage critical thinking skills in athletic training education and in their supervision responses to continue to advance the clinical learning and preparation for entry-level athletic trainers. Currently, there is no required model of supervision for athletic training clinical education except that there must be direct supervision of students.

Differences also were noted between how the students and the CIs perceived the CIs' supervision responses. Students felt they were given more responsibility and were permitted to perform more athletic training skills with greater amounts of autonomy at the end of their clinical experiences as compared to the beginning. The students also perceived that the CIs encouraged them to be more motivated and have a higher self-awareness at the end of the clinical experiences than at the beginning. Their CIs believed that the amount of autonomy they gave to the students and the levels of motivation and self-awareness of the students did not change over the course of the clinical experiences. This may have occurred because the students in this sample had limited opportunities to successfully reflect on their learning experiences previously, but at the end of their experiences they were forced to reflect when they completed the research evaluations that assessed their perception of their levels of autonomy, motivation and self-awareness and identified that they were higher than the skill levels demonstrated to the CIs. Other reason why this may have occurred is because of the youth and inexperience of the students with self-evaluation and reflection. This also may have occurred because at the end of the clinical experience, as the students did more of the same skills, they perceived themselves as being supervised at a different level.

The results of the CCTST, as well as the results of the CI-S showed no change even when the S-PS did reflect a change. This may have happened due to the students' self-perceptions at the end of their clinical education experience they were doing more so they were learning more, even while they remained at a moderate level of critical thinking throughout the clinical education experience. The different perceptions of the ATS and the CI may have occurred because the student had few opportunities to successfully reflect on the level of autonomy, motivation and self-awareness that they have throughout the clinical education experience, when they do (through completing the S-PS) their perception is higher than actual. The CI, being more mature and experienced, may be more accurate in their perceptions of the students' levels of thinking and in return their supervision responses, reflected on the CI-S, did not change over time because they did not notice a change in the critical thinking levels of the students. All of these explanations are plausible; however, due to the limited number of participants in this study, further investigation will need to be done to confirm this conclusion.

Although the CIs did not perceive changes in their supervision responses over time, the CIs consistently believed that they gave the students greater amounts of autonomy, allowing for greater levels of self-awareness and motivation than what the students perceived that the CIs provided. The CIs perceived that they allowed the younger group of students to have greater autonomy, allowing for more self-awareness and motivation than they did for the older students. This may have occurred, because the amount and type of experiences that the younger students were permitted to do involved less patient care and less complicated skills than were expected of the older students. Because students are only able to perform skills after they have been taught and evaluated

completing the skill, and older students have a larger skill set than do the younger students, the older students may have been evaluated not only on more CIPs, but also with higher expectations for the performance of those clinical skills. This difference of expectation could impact the CIs' evaluations of the students when completing the CI-S. Further study is recommended to confirm this hypothesis.

The older students' perceptions of the CI responses differed from the younger students in that the older students believed that the CIs gave them greater amounts of autonomy, allowing them to develop greater levels of motivation and self-awareness than what the younger students believed to have happened. This may have occurred, because the older students have learned more clinical skills than have the younger students and were permitted to engage and care for patients at more advanced levels thereby increasing the likelihood that students perceived that they had greater amounts of autonomy than did the younger students. Although this question is outside the limits of this study it may have impacted the outcomes of the current study and can be evaluated at a later date on the data that were collected on what CIPs students were expected to be able to perform by level in the program.

When examining the relationship of the CIs' supervision responses to the CTSs of the ATSs, results show that at the beginning of the clinical education experience the CIs' supervision responses were appropriate for the levels of the students' critical thinking skills. This suggests that the CIs took time to get to know and understand the students and recognized the students' different levels of critical thinking skill. Over time, the CIs' supervision responses did not change even when the CCTST results demonstrated a decrease in CTS level. Because the CCTST results did not fall out of the moderate level

of CT, the CIs' supervision responses continued to be consistent with the levels of critical thinking demonstrated by the students. It is possible that had the CIs adapted their supervision responses to the decreasing levels of ATS CT, they may have promoted higher levels of critical thinking.

To examine the relationship between the students CTS and the CIs' supervision responses to the CTS, the CCTST results and the evaluation results from the S-PS and CI-S were compared. These evaluations reflected that the students demonstrated higher levels of critical thinking during clinical education experiences than they demonstrated on the CCTST even though both tools identified the student CTS at moderate levels. The CCTST involves more general problem solving/critical thinking situations, whereas the S-PS and CI-S was developed using more Athletic Training specific situations that incorporated from the Clinical Integrated Proficiencies (CIPs)[15]and applied the Integrated Developmental Model (IDM) to how the IDM applied evaluation of specific athletic training skills[12]. This is a particularly important point, because it is recommended that critical thinking skills should be taught and learned in discipline-related practice, so it would be appropriate to conclude that they should be evaluated that way.[179]While the S-PS and CI-S results and the CCTST results both reflected the students demonstrating a moderate level of CTS over time, the S-PS and CI-S may be a more appropriate tool for assessing the CIs' supervision responses and the students' levels of critical thinking specifically in the athletic training setting. To validate this point, however, much more intensive reliability and validity studies would need to be conducted on and with the instruments.

Limitations to the Study

The limitations to this study are: the small sample size and the use of a convenient sample. While the findings from this study are not able to be generalized to the total population of CAATE programs due to the small sample, educators and CIs may use the recommendations found from this study to identify possible improvements for student clinical education in their setting. Another limitation was that the timing of the administration of the CCTST and S-PS could vary from institution to institution; the primary investigator purposefully had this level of flexibility in her design to address the individual needs of the institutions participating in the study. Since the CCTST could be administered at the same time as the S-PS increasing the time requirement for completing the study or at a totally separate time, making the timing consistent with other ATEPs who students only completed the CCTST, this differential in timing of administration and/or possible fatigue of the students participating in the study may have varied.

The reliability assessment was completed in conjunction with the onset assessment of CI supervision responses. This did not allow for further survey modifications if needed from the reliability and validity results. Due to the low number of participants, determining concurrent validity between the instruments used in the study was not completed.

The inability to follow the students throughout all of their clinical education experiences or even through another clinical experience other than the fall experience which can be a time of high stress, work, and health professional interventions (particularly with expectations associated with football). This study was completed during a fall clinical experience where there is a high focus on football. CI's may have a

large number of patient/athletes they are responsible for as well as the ATSs to supervise. This could impact the results of this study as well as the supervision responses that occur during the high risk activity. The students are exposed to various CIPs during each clinical education experience which may impact the results of the evaluations used.

Implications for Future Research

This pilot study created results that support performing this research on a much larger scale. The evaluation tools (S-PS and CI-S) used in the study were found to be reliable and valid for use in future studies. These tools also could be used to determine how frequently the CIs allowed the students to perform the required CIPs during clinical experiences. Data collected for this study could be used for future research to determine if there are specific CIPs that students were consistently not observed performing during clinical experiences or that students are almost never able to perform independently; i.e. appropriate emergency care (CPR, supplemental oxygen or spinal stabilization).

The clinical assignment of the ATS becomes important not only when developing CTSs, but also when attempting to ensure continued learning and development of CTS. Future research should be done to determine if the setting of clinical education or the level (e.g. NCAA division), duration, and patient population impacted students' levels of critical thinking or whether there were certain assignments that promoted higher levels of CT.

Because the development of CTS is not isolated to clinical education and supervision, further research into how CTS are developed throughout the entire ATEP curriculum may be helpful to assist in making best practice recommendations. This can begin with a discriminative analysis using data collected during this pilot study, as well

as by examining curricula for when proficiencies are instructed and when/if the performance of corresponding CIPs are completed during clinical education experiences. A closer investigation of what skills (CIPs) the students complete during real life clinical experiences versus class scenarios also would assist in identifying whether the ATSs develop appropriate levels of critical thinking to prepare them for entry-level positions.

Summary

Because of the increase in the amount of content covered in the didactic portion of the athletic training curriculum, it is often difficult for the academic instructors to present new information, as well as challenge the students to develop higher levels of thinking. Often times, the students become focused on memorizing, repeating, saying and doing the 'right thing' when questioned to the level that interferes with their abilities to move from concrete to the abstract conceptualization stage of thinking. The results of this study provides evidence to support the concern of AT professionals, that clinical education, the way it is structured today, may actually prevent the students from developing the level of critical thinking skills needed for them to function effectively as entry level athletic trainers and that the supervision responses of CIs may not be encouraging the students to utilize higher levels of thinking while performing athletic training skills during their clinical education experiences. Dewey stated that for the learner to mature the educational environment should facilitate the reflective process, be student-centered, and be realistic.[19] This statement holds true for not only learning in the classroom and laboratory setting, but also during clinical education.

BIBLIOGRAPHY

1. Payton O. Clinical reasoning process in physical therapy. *Phys Ther*. 1985;65:924-928.

2. Harrelson G, Leaver-Dunn D. Using the experiential learning cycle in clinical instruction. *Athletic Therapy Today*. 2002;7(5):23-27.

3. Weidner T. *The athletic trainer's pocket guide to clinical teaching.* 1st ed. Thorofare, NJ: SLACK Incorporated; 2009:187.

4. Gardner G, Harrelson GL. Situational teaching: Meeting the needs of evolving learners. *Athletic Therapy Today*. 2002;7(5):18. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2003032505&site=ehost-live&scope=site.

5. National Athletic Trainers' Association. *Clinical instructor educator seminar handbook.* Dallas TX: NATA,Inc; 2002:86.

6. National Athletic Trainers' Association. *Athletic training educational competencies.* 4th ed. Dallas TX: NATA; 2006:63.

7. Commission on Accreditation of Athletic Training Education. *Standards for the accreditation of entry-level athletic training education programs.* 4th ed. Dallas Texas: National Athletic Trainers Association; 2008.

8. Gardner G, Sexton P, Guyer S, et al. Clinical instruction for professional practice. *Athletic Training Education Journal*. 2009;4(1):28-31.

9. Sexton P, Levy L, Willeford S, Barnum M, Gardner G, Susan, Fincher AL. Supervised autonomy. *Athletic Training Education Journal*. 2009;4(1):14-18.

10. Draper D. An evaluation model of the student athletic trainer's clinical experience. *Journal of Athletic Training*. 1987;22:111-112.

11. Roche JP. Educational innovations. A pilot study of teaching clinical decision making with the clinical educator model. *J Nurs Educ*. 2002;41(8):365-367. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2002133231&site=ehost-live&scope=site.

12. Stoltenberg CD, McNeil BW, Romans JS. The integrated developmental model of supervison: Scale development and validation procedures. *Journal of Counseling Psychology*. 1992:504-507.

13. Geisler P, Lazenby T. Clinical reasoning in athletic training education: Modeling expert thinking. *Athletic Training Education Journal*. 2009;4(2):52-65.

14. Scheffer BK, Rubenfeld MG. A consensus statement on critical thinking in nursing. *J Nurs Educ*. 2000;39(8):352-359. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001014960&site=ehost-live.

15. National Athletic Trainers' Association. *Athletic training education competencies.* 5th ed. Dallas, TX: National Athletic Trainers' Association; 2011:35.

16. Facione PA. Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. Research findings and recommendations. . 1990:20. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED315423&site=ehost-live.

17. Facione NC, ed. *California critical thinking skills test manual.* Millbrae, CA: Insight Assessment/California Academic Press; 2012.

18. Stoltenberg CD. Enhancing professional competence through developmental approaches to supervision. *Am Psychol*. 2005;60(8):857-864. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ733605&site=ehost-live&scope=site; http://content.apa.org/journals/amp/60/8.

19. Dewey J. *How we think.* 2nd ed. Boston, MA: DC Heath; 1933.

20. Kolb D. *Experiential learning. Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall; 1984.

21. Knight K. Educational perceptions vs. reality; classroom and clinical education. *Athletic Training Education Journal*. 2006; 1:15-17.

22. Eaton DM, Cottrell D. Structured teaching methods enhance skill acquisition but not problem-solving abilities: An evaluation of the 'silent run through'. *Med Educ*. 1999;33(1):19-23. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2001017610&site=ehost-live&scope=site.

23. Spike N, Alexander H, Elliott S, et al. In-training assessment - its potential in enhancing clinical teaching. *Med Educ*. 2000; 34(10):858-861. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009443174&site=ehost-live&scope=site.

24. Strickland J, Slemson D, Weber R. Increasing the quantity of the clinical education experience. *Optometric Education*. 1996; 22(1):22-28.

25. Brownstein L, Rettie CS, George C. A programme to prepare instructors for clinical teaching... presented at the annual seminar of the American academy of cardiovascular

perfusion, San Diego, California 31 January -- 3 February 1997. *Perfusion*. 1998; 13(1):59-65. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1998043617&site=ehost-live&scope=site.

26. Wright D. Verbal behaviors occurring in biology classes engaged in inquiry learning. *National Association for Research in Science Teaching*. 1973:Detriot, MI.

27. Zorga S. Supervision: The process of life-long learning in social and educational professions. *J INTERPROF CARE*. 2002; 16(3):265-276. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009449422&site=ehost-live&scope=site.

28. Whei MS, Masoodi J, Kopp M. Teaching critical thinking in the clinical laboratory. *Nurs Forum*. 2000;35(4):30. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=4451414&site=ehost-live.

29. Commission on Accreditation of Athletic Training Education. Graded supervision and supervised autonomy. *Commission on Accreditation of Athletic Training Update*. 2007;6(1):2-3.

30. Scriber K, Trowbridge C. Is direct supervision in clinical education for athletic training students always necessary to enhance student learning? *Athletic Training Education Journal*. 2009;4(1):32-37.

31. Willeford S, Fincher AL, Barnum M, et al. Improving clinical education through proper supervision. *Athletic Training Education Journal*. 2009;4(1):6-7.

32. Levy L, Gardner G, Barnum M, et al. Situational supervision for athletic training clinical education. *Athletic Training Education Journal*. 2009;4(1):19-22.

33. Weidner T. The supervision, questioning, feedback model of clinical teaching. In: *The athletic trainer's pocket guide to clinical teaching.* SLACK, Inc.; 2009:85.

34. Weidner T, Pipkin JB. Clinical supervision of athletic training students at colleges and universities needs improvement. *Journal of Athletic Training*. 2002;37(4 Supplement):S-241-S-247.

35. Weidner T. Reflections on athletic training education reform. *Athletic Training Education Journal*. 2006;1(1):6-7.

36. Smith M. David A. Kolb on experiential learning. *The Encyclopedia of Informational Education*. 2001.

37. Armstrong KJ, Weidner TG, Walker SE. Athletic training approved clinical instructors' reports of real-time opportunities for evaluating clinical proficiencies. *J Athl Train*. 2009;44(6):630-638. http://search.ebscohost.com/login.aspx?direct=true&db=mnh&AN=19911090&site=ehost-live&scope=site.

38. Craig D. Learning professionalism in athletic training education. *Journal of Athletic Training*. 2006;1(1):8-11.

39. Knight K. Editorial: Hyposkillia & critical thinking: What's the connection? *Athletic Training Education Journal*. 2008;3:79-81.

40. Weidner T, Noble GL, Pipkin JB. Athletic training students in the college/ university setting and the scope of clinical education. *J ATHLETIC TRAIN*. 2006;41(4):422-426. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009489281&site=ehost-live&scope=site.

41. Knight K. Progressive skill development and progressive experience responsibility. *Athletic Training Education Journal*. 2008;1(1):2-4.

42. Barnum MG. Questioning skills demonstrated by approved clinical instructors during clinical field experiences. *J Athl Train*. 2008;43(3):284-292. http://search.ebscohost.com/login.aspx?direct=true&db=mnh&AN=18523565&site=ehost-live&scope=site.

43. Martin M. Let's not forget what the educational experience should be! *NATA News*. 2001;12:18.

44. National Athletic Trainers' Association. Career placement. 1983.

45. O'Shea M. *A history of the national athletic trainers association.* 1st ed. Greenville, NC: NATA Publications; 1980:82.

46. Delforge G, Behnke R. The history and evolution of athletic training education in the United States. *Journal of Athletic Training*. 1999; 34(1):53-61.

47. NATA Education Taskforce. Recommendations to the NATA board of directors. *NATA News*. 1996; February: 24-27.

48. Hunt V. Progress of a profession: Athletic training matures, sets stage for future. *NATA News*. 1998; January: 8-11.

49. Fuller D. Critical thinking in undergraduate athletic training education. *Journal of Athletic Training*. 1997; 32(3):242-247.

50. Knight K. Supervision of clinical education: A call for a paradigm shift. *Athletic Training Education Journal*. 2009; 4(1):2-3.

51. Massie JB, Strang A, Ward R. Employer perceptions of the academic preparation of entry-level certified athletic trainers. *Athletic Training Education Journal*. 2009; 4(2):70-74.

52. Schellhase K. Applying mastery learning to athletic training education. *Athletic Training Education Journal*. 2008; 3(4):130-134.

53. Walker S. Active learning strategies to promote critical thinking. *Journal of Athletic Training*. 2003;38(3):263-267.

54. Knight K. It's all about students...learning. *Athletic Training Education Journal*. 2007;2(1):3.

55. McLean L. Attachment to national athletic trainers' association certification committee's report to the board of directors, accepted in June 1978. *Located at the NATABOC office*. 1978;Omaha(Nebraska).

56. National Athletic Trainers' Association. NATA certification news. 1987;5(5).

57. Commission on Accreditation of Allied Health Education Programs. *Standards and guidelines for the athletic trainer.* Chicago, IL: Commission on Accreditation of Allied Health Education Programs; 2001.

58. Kurfiss J. Critical thinking: Theory, research, practice, and possibilities. *ASHE-Eric Higher Education*. 1988;2.

59. Bruning R, Schraw G, Norby M, Ronning R. *Cognitive psychology and instruction.* 4th ed. Upper Saddle River, NJ: Pearson Education, Inc.; 2004:162-192.

60. Loken L. *Critical thinking abilities of undergraduaate entry-level athletic training students.* [Doctor of Education]. University of South Dakota; 2005.

61. Dewey J. *Experience and education.* New York: Touchstone; 1938.

62. Kraischsk M, Anthony M. Benefits and outcomes of staff nurses' participation in decision-making. *Journal of Nursing Administration*. 2001;31(1):16-23.

63. McCarthy M. Detecting acute confusion in older adults: Comparing clinical reasoning of nurses working in cute, long-term, and community health care environments. *Research in Nursing and Health*. 2003;26:203-212.

64. Norman G. Research in clinical reasoning: Past history and current trends. *Med Educ*. 2005;39:418-427.

65. van der Vleuten ,Cees, Newble D. How can we test clinical reasoning? *The Lancet*. 1995;345:1030-1035.

66. Vendrely A. Critical thinking skills during a physical therapist professional education program. *Journal of Physical Therapy Education*. 2005;19(1):55-59.

67. Oermann M. Evaluating critical thinking in clinical practice. *Nurse Educator*. 1997;22(5):25-28.

68. Leaver-Dunn D, Harrelson G, Martin M, Wyatt T. Critical-thinking predisposition among undergraduate athletic training students. *Journal of Athletic Training* 2002;37(4 supplement):S-147-151.

69. Geertsen HR. Rethinking thinking about higher-level thinking. *Teaching Sociology*. 2003;1(31):1-19.

70. Costa AL. Toward a model of human intellectual functioning. In: Arthor L Costa, ed. *Developing minds: Resource book for teaching thinking.* Alexandria, VA: Association for Supervision and Curriculum Development; 1985:62-65.

71. Presseisen BZ. *Thinking skills throughout the curriculum: A conceptual design.* Bloomington, IN: Phi Lambdaa Theta, Inc; 1987.

72. Beyer BK. *Practical strategies for the teaching of thinking.* Boston, MA: Allyn and Bacon; 1987.

73. Assaf MA. Teaching and thinking: A literature review of the teaching of thinking skills. *Online Submission*. 2009. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED505029&site=ehost-live.

74. Kagan S. Kagan structures for thinking skills. Kagan Online Web site. http://www.kaganonline.com/free_articles/dr_kagan/ASK22.php. Published 2003. Updated 2010. Accessed 8/27, 2010.

75. Daly WM. Critical thinking as an outcome of nursing education. What is it? Why is it important to nursing practice? *J Adv Nurs*. 1998;28(2):323-331. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=5277833&site=ehost-live. doi: 10.1046/j.1365-2648.1998.00783.x.

76. Henson K. Foundations for learner-centered education: A knowledge base. *Education*. 2003;124(1):5-15.

77. Miettinen R. About the legacy of experiential learning. *Lifelong Learning in Europe*. 1998;3(3):165-71.

http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ574787&site=ehost-live&scope=site.

78. Miettinen R. The concept of experiential learning and John Dewey's theory of reflective thought and action. *International Journal of Lifelong Education*. 2000;19(1):54-72.

79. Piaget J. Development and learning. In: Ripple R, Rockcastle V, eds. *Piaget rediscovered.* New York NY: WH Freeman and Company; 1964:7-20.

80. Gauvain M, Cole M, eds. *Readings on the development of children.* 2nd ed. New York: W.H. Freeman & Company; 1997.

81. Piaget J. *The child's conception of physical causality.* London: Routledge and Kegan Paul; 1930.

82. Sutherland P. The application of piagetian and neo-piagetian ideas to further and higher education. *International Journal of Lifelong Education*. 1999;18(4):286-294.

83. Peters M. Kinds of thinking, styles of reasoning. *Educational Philosophy and Theory*. 2007:350-363.

84. Phillips J. Do students think as we do? Progress with Piaget. *Improving College and University Teaching*. 1982;30(4).

85. Sutherland P. An expansion of peel's describer-explainer stage theory. *Educational Review*. 1982;34(1):69-79.

86. Piaget J. Intellectual evolution from adolescence to adulthood. *Human Development*. 1972;15:1-12.

87. Clark D. Kolb's learning styles and experiential learning model. Instructional System Design Concept Map Web site. http://www.nwlink.com/~donclark/hrd/styles/kolb.html. Updated 2008. Accessed 02/11, 2011.

88. Sugarman L. Kolb's model of experiential learning: Touchstone for trainers, students, counselors, and clients. *Journal of Counseling & Development*. 1985;64(4):264-68. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ329206&site=ehost-live&scope=site.

89. Healey M, Jenkins A. Learning cycles and learning styles: Kolb's experiential learning theory and its application in geography in higher education. *Journal of Geography*. 2000;99:185-195.

90. Shellhase KC. *Athletic Training Education Journal*. 2006(2):18-27.

91. Bergsteiner H, Avery GC, Neumann R. Kolb's experiential learning model: Critique from a modeling perspective. *Studies in Continuing Education*. 2010;32(1):29-46. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ880653&site=ehost-live&scope=site; http://www.informaworld.com/openurl?genre=article&id=doi:10.1080/01580370903534355.

92. Brennan D. Expanding a critque of kolb's experiential learning theory. *32nd Annual International Conference of the Association for Experiential Education*. 2004:30.

93. Brookfield SD. Experiential pedagogy: Grounding teaching in students' learning. *Journal of Experiential Education*. 1996;19(2):62-68.

94. Elder L. Our concept of critical thinking. The Critical Thinking Community Web site. http://www.criticalthinking.org/page.cfm?PageID=411&CaegoryID=51. Published 2007. Updated 2009. Accessed 6/8, 2009.

95. Guralnik D, ed. *Webster's new world dictionary of the American language.* New York, New York: ; 1984.

96. Halpern DF. Teaching critical thinking for transfer across domains: Disposition, skills, structure training, and metacognitive monitoring. *Am Psychol*. 1998;53(4):449-455. http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=amp-53-4-449&site=ehost-live&scope=site. doi: 10.1037/0003-066X.53.4.449.

97. Marzano RJ. What are the general skills of thinking and reasoning and how. *Clearing House*. 1998;71(5):268. http://search.ebscohost.com/login.aspx?direct=true&db=afh&AN=564611&site=ehost-live.

98. Ennis RH. Teaching critical thinking (book). *Educational Studies*. 1992;23(4):462. http://search.ebscohost.com/login.aspx?direct=true&db=afh&AN=7583427&site=ehost-live.

99. McBride R. Critical thinking: An overview with implications for physical education. *Journal of Teaching in Physical Education*. 1991;11:112-125.

100. Stecyk S. *Critical thinking abilities of athletic training students.* [Doctor of Philosophy]. Ohio University; 2004.

101. Yang Y, Chou H. Beyond critical thinking skills: Investigating the relationship between critical thinking skills and dispositions through different online instructional strategies. *British Journal of Educational Technology*. 2008;39(3):666-684.

102. Halpern DF. Teaching critical thinking for transfer across domains. *Am Psychol*. 1998;53(4):449-455.

http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=amp-53-4-449&site=ehost-live. doi: 10.1037/0003-066X.53.4.449.

103. Brunt BA. Models, measurement, and strategies in developing critical-thinking skills. *J Contin Educ Nurs*. 2005;36(6):255. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009069450&site=ehost-live.

104. Browne MN, Hoag J, Boudreau N. Critical thinking in graduate economic programs: A study of faculty perceptions. *Journal of Economic Education*. 1995;26:177-181.

105. Schwager S, Labate C. Teaching for critical thinking in physical education. *Journal of Physical Education, Recreation, and Dance*. 1993;64:24-26.

106. Bucy M. Encouraging critical thinking through expert panel discussions. *College Teaching*. 2006:222-224.

107. Slaughter D, Brown D, Gardner D, Perritt L. Improving physical therapy students' clinical problem-solving skills: An analytical questioning model. *Physical Therapy*. 1989;69:441-447.

108. Scott J, Markert R, Dunn M. Critical thinking: Change during medical school and relationship to performance in clinical clerkships. *Medicl Education*. 1998;32:14-18.

109. National League of Nursing. *Criteria for the evaluation of baccalaureate and higher degree programs in nursing.* 6th ed. New York, NY: National League of Nursing; 1989.

110. Walsh CM, Seldomridge LA. Critical thinking: Back to square two. *J Nurs Educ*. 2006;45(6):212-219. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009209762&site=ehost-live.

111. Brown JM, Alverson EM, Pepa CA. The influence of a baccalaureate program on traditional, RN-BSN, and accelerated students' critical thinking abilities. *Holist Nurs Pract*. 2001;15(3):4-8. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=6779759&site=ehost-live.

112. Turner P. CRITICAL THINKING in nursing education and practice as defined in the literature. *Nursing Education Perspectives*. 2005;26(5):272-277. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=18337369&site=ehost-live.

113. May BA, Edell V, Butell S, Doughty J, Langford C. Critical thinking and clinical competence: A study of their relationship in BSN seniors. *J Nurs Educ*. 1999;38(3):100-110.

http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1999034744&site=ehost-live.

114. Velde BP, Wittman PP, Vos P. Development of critical thinking in occupational therapy students. *Occupational Therapy International*. 2006;13(1):49-60. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=20458945&site=ehost-live. doi: 10.1002/oti.20.

115. Toofany S. Critical thinking among nurses. *Nursing Management - UK*. 2008;14(9):28-31. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=29340009&site=ehost-live.

116. Adams MH, Stover LM, Whitlow JF. A longitudinal evaluation of baccalaureate nursing students' critical thinking abilities. *J Nurs Educ*. 1999;38(3):139-141. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1999034750&site=ehost-live.

117. Broadbear JT, Keyser BB. An approach to teaching for critical thinking in health education. *J Sch Health*. 2000;70(8):322. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=3675813&site=ehost-live.

118. Richmond B. Systems thinking: Critical thinking skills for the 1990s and beyond. *System Dynamics Review*. 1993;9(2):113-133.

119. Riddell T. Critical assumptions: Thinking critically about critical thinking. *J Nurs Educ*. 2007;46(3):121-126. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009527695&site=ehost-live.

120. Pepa CA, Brown JM, Alverson EM. A comparison of critical thinking abilities between accelerated and traditional baccalaureate nursing students. *J Nurs Educ*. 1997;36(1):46-48. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1997010244&site=ehost-live.

121. Raymond C, Profetto-McGrath J. Nurse educators' critical thinking: Reflection and measurement. *Nurse Education in Practice*. 2005;5:209-217.

122. Dexter P, Applegate M, Backer J, et al. A proposed framework for teaching and evaluating critical thinking in nursing. *J Prof Nurs*. 1997;13(3):160-167. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=1997025418&site=ehost-live&scope=site.

123. Neibert P. Novice to expert practice via post-professional athletic training education: A grounded theory. *J ATHLETIC TRAIN*. 2009;44(4):378-390.

124. Walker J. Debriefing: Enhancing experiential learning. *Journal of Family and Consumer Sciences*. 2005;97(1):73-75. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ737021&site=ehost-live&scope=site; http://www.aafcs.org/resources/jfcs.html.

125. Osler W. *The hospital as a college: Aequanimitas and other addresses.* Philadelphia, PA: Blakiston's Son & Co; 1928:p 121.

126. Snow A. History and development of mechanical vibration therapy. In: *Early American manual therapy.* ; 1912. http://www.meridianinstitute.com//eamt/files/snow/mvch1.htm. Accessed 07/27/10.

127. Baird A, Baird N. The doctor in roman society. http://www.hsl.virginia.edu/historical/artifacts/antiqua/doctors.cfm. Updated 2009. Accessed 07/22, 2010.

128. Kreis S. The medieval world view. History Guide Web site. http://www.historyguide.org/ancient/lecture24b.html. Published 2000. Updated 2009. Accessed 07/22, 2010.

129. Packman CH, Krackov SK. Practice-based education for medical students: The doctor's office as a classroom. *Teach Learn Meth*. 1993;5:193.

130. Ludmerer KM. The plight of clinical teaching. In: *Learning to heal.* New York, NY: Basic Books; 1985:152-165.

131. Lippard V. *A half-centry of American medical education.* New York, NY: Macy Foundation; 1974.

132. Loganbill C, Hardy E, Delworth U. Supervision: A conceptual model. *The Counseling Psychologist*. 1982;10:3-42.

133. Cooke M, Irby D, Sullivan W, Ludmerer KM. American medical education 100 years after the flexner report. *The New England Journal of Medicine*. 2006;355(13):1339-1344.

134. Beck A. The flexner report and the standardization of american medical education. *JAMA*. 2004;291(17):2139-2140.

135. Association of American Medical Colleges. Physicians for the twenty-first century. the GPEP report: Report of the panel on the general professional education of the physician and college preparation for medicine. *Association of American Medical Colleges*. 1984;Washington, DC:4-19.

136. Hansen A. The future of medical education in the united states: The GPEP report. *Journal of the National Medical Association*. 1985;77(10):775-776.

137. Grace P. Milestones in athletic trainer certification. *Journal of Athletic Training*. 1999;34(3):285-291.

138. Newell W. Keynote address: Reflections on athletic training. *Athletic Training*. 1984(Winter):256-258.

139. Commission on Accreditation of Athletic Training Education. Overview of the commission. Commission on Accreditation of Athletic Training Education Web site. www.caate.net. Updated 2010. Accessed Dec/12, 2010.

140. Weidner T, Henning J. Historical perspective of athletic training clinical education. *Journal of Athletic Training*. 2002;37(4 Supplement):S-222-228.

141. National Athletic Trainers' Association Board of Certification Inc. Credentialing information: Entry-level eligibility requirements. . 1997.

142. Weidner T, August J. The athletic therapist as clinical instructor. *Athletic Therapy Today*. 1997;2:49-53.

143. Denegar C, Hertel J. Clinical education reform and evidence-based clinical practice guidelines. *Journal of Athletic Training*. 2002;37(2):127-128.

144. Laurent T, Weidner T. Clinical education: Setting standards are helpful in the professional preparation of employed, entry-level certified athletic trainers. *Journal of Athletic Training*. 2002;37(4 Supplement):S-248-S-252.

145. Bernard J, Goodyear R. *Fundamental of clinical supervision.* 2nd ed. Boston: Allyn & Bacon; 1998.

146. School of Education. Definition and components of supervision. Definition and components of supervision Web site. http://soe.syr.edu/academic/counseling_and_human_services/modules/Prapering_for_Supervision. Accessed 02/02, 2012.

147. Holloway EL, Wolleat PL. Supervision: The pragmatics of empowerment. *Journal of Educational & Psychological Consultation*. 1994;5(1):23. http://search.ebscohost.com/login.aspx?direct=true&db=afh&AN=7437584&site=ehost-live.

148. Holloway EL. A bridge of knowing: The scholar-practitioner of supervision. *Couns Psychol Q*. 1994;7(1):3-3. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009460939&site=ehost-live&scope=site.

149. Haynes R, Corey G, Moulton P. *Clinical supervision in the helping professions: A practical guide.* Pacific Grove, CA: Brooks/Cole; 2003:54-132.

150. Malone WJ. Clinical supervision: We are more than bosses....we are leaders. *Home Study Course*. 2009.

151. Littrell J, Lee-Borden N, Lorenz J. A developmental framework for counseling supervision. *Counselor Education & Supervision*. 1979;17:262-271.

152. Stoltenberg CD. Approaching supervision from a developmental perspective: The counselor complexity model. *Journal of Counseling Psychology*. 1981;28:59-65.

153. Stoltenberg CD, Delworth U. *Supervising counselors and therapists.* First Ed. San Francisco: Jossey-Bass; 1987:223.

154. Bear TM, Kivlighan DM, J. Single-subject examination of the process of supervision of beginning and advanced supervisees. *Professional Psychology: Research and Practice*. 1994;25(4):450-457.

155. Loganbill C, Stoltenberg CD. A case conceptualization format as a training device for practicum. *Counselor Education & Supervision*. 1983;22:235-241.

156. Smith K. A brief summary of supervision models. 2009:1-9.

157. Sias SM, Lambie GW. An integrative social-cognitive developmental model of supervision for substance abuse counselors-in-training. *Journal Teach Addict.* 2008;7(1):57-74. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009960562&site=ehost-live&scope=site.

158. Stoltenberg CD, McNeill B.W. Supervision from a developmental perspective: Research and practice. In: Watkins C.E., ed. *Handbook of psychotherapy supervision.* John Wiley and sons Ltd.; 1997:184-202.

159. Manners J, Durkin K, Nesdale A. Promoting advanced ego development among adults. *Journal of Adult Development*. 2004;11(1):19-27.

160. Zimmerman B, Schunk D, eds. *Educational psychology: A century of contributions.* Mahwah, NJ: Lawrence Erlbaum Associates; 2003.

161. Wiley MO, Ray PB. Counseling supervision by developmental level. *Journal of Counseling Psychology*. 1986;33(4):439-445.

162. Dijksterhuis M, Voorhuis M, Teunissen PW, et al. Assessment of competence and progressive independence in postgraduate clinical training. *Med Educ*. 2009;43(12):1156-1165.

http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2010485483&site=ehost-live&scope=site.

163. Spence SH, Wilson J, Kavanagh D, Strong J, Worral L. Clinical supervision in four mental health professions: A review of the evidence. *Behavior Change*. 2001;18:135-155.

164. Lekkas P, Larsen T, Kumar S, et al. No model of clinical education for physiotherapy students is superior to another: A systematic review. *Australian Journal of Physiotherapy*. 2007;53:19-28.

165. Scriber K, Wolohan J. Sports law review: Universities can no longer justify using athletic training students in place of certified athletic trainers. *Athletic Business*. 2003;7:26-30.

166. Davis C, Misasi S. Student athletic trainer vs. athletic training student: Get over it and get on with it! *NATA News*. 2001;August:16.

167. Facione PA. The california critical thinking skills test--college level. Technical report #1. Experimental validation and content validity. . 1990. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED327549&site=ehost-live&scope=site.

168. Facione PA. The California critical thinking skills test--college level. technical report #2. factors predictive of CT skills. 1990. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED327550&site=ehost-live&scope=site.

169. Facione PA. *Using the California critical thinking skills test in research, evaluation, and assessment.* Millbrae, CA: California Academic Press; 1991:22. Accessed 3/18/2009.

170. Facione PA. The California critical thinking skills test--college level. technical report #4. interpreting the CCTST. *California Academic Press*. 1990;4.

171. Norris SP, Memorial Univ, St John's (Newfoundland) Inst for Educational Research,and Development. Studies of thinking processes and the construct validation of critical thinking tests. studies in critical thinking research report no. 2. . 1985. http://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=ED264259&site=ehost-live.

172. Nunnally J. *Psychometric theory.* 2nd ed. New York: McGraw-Hill; 1978.

173. Kline P. *Handbook of psychological testing.* 2nd ed. London: Routledge; 1999.

174. Cronbach L. Coefficient alpha and the internal structure of tests. *Psychometrika*. 1951;16:297-334.

175. Duchscher JEB. Catching the wave: Understanding the concept of critical thinking. *J Adv Nurs*. 1999;29(3):577-583. http://search.ebscohost.com/login.aspx?direct=true&db=hch&AN=5866908&site=ehost-live. doi: 10.1046/j.1365-2648.1999.00925.x.

176. Walsh CM, Seldomridge LA. Measuring critical thinking: One step forward, one step back. *Nurse Educ*. 2006;31(4):159-162. http://search.ebscohost.com/login.aspx?direct=true&db=rzh&AN=2009251308&site=ehost-live.

177. Commission on Accreditation of Athletic Training Education. Standars for the accreditation of professional athletic training programs. . 2012.

178. Carnegie Mellon University Eberly Center. What is the difference between formative and summative assessment? Teaching Excellence & Educational Innovation Web site. http://www.cum.edu/teaching/assessment/basics/formative-summative.html. Updated 2013. Accessed June/6, 2013.

179. Kenimer E. The identification and description of critical thinking behaviors in the practice of clinical laboratory science, part 1: Design, impementation, evaluation, and results of a national survey. *Journal of Allied Health*. 2002;31(2):56.

180. Microsoft Office Excel, 2007.

Appendix A- Clinical Integrated Proficiencies[15]

Clinical Integration Proficiencies (CIP)

The clinical integration proficiencies (CIPs) represent the synthesis and integration of knowledge, skills, and clinical decision-making into actual client/patient care. The CIPs have been reorganized into this section (rather than at the end of each content area) to reflect their global nature. For example, therapeutic interventions do not occur in isolation from physical assessment.

In most cases, assessment of the CIPs should occur when the student is engaged in real client/patient care and may be necessarily assessed over multiple interactions with the same client/patient. In a few instances, assessment may require simulated scenarios, as certain circumstances may occur rarely but are nevertheless important to the well-prepared practitioner.

The incorporation of evidence-based practice principles into care provided by athletic trainers is central to optimizing outcomes. Assessment of student competence in the CIPs should reflect the extent to which these principles are integrated. Assessment of students in the use of Foundational Behaviors in the context of real patient care should also occur.

Prevention & Health Promotion

CIP-1 Administer testing procedures to obtain baseline data regarding a client's/patient's level of general health (including nutritional habits, physical activity status, and body composition). Use this data to design, implement, evaluate, and modify a program specific to the performance and health goals of the patient. This will include instructing the patient in the proper performance of the activities, recognizing the warning signs and symptoms of potential injuries and illnesses that may occur, and explaining the role of exercise in maintaining overall health and the prevention of diseases. Incorporate contemporary behavioral change theory when educating clients/patients and associated individuals to effect health-related change. Refer to other medical and health professionals when appropriate.

CIP-2 Select, apply, evaluate, and modify appropriate standard protective equipment, taping, wrapping, bracing, padding, and other custom devices for the client/patient in order to prevent and/or minimize the risk of injury to the head, torso, spine, and extremities for safe participation in sport or other physical activity.

CIP-3 Develop, implement, and monitor prevention strategies for at-risk individuals (eg, persons with asthma or diabetes, persons with a previous history of heat illness, persons with sickle cell trait) and large groups to allow safe physical activity in a variety of conditions. This includes obtaining and interpreting data related to potentially hazardous environmental conditions, monitoring body functions (eg,

blood glucose, peak expiratory flow, hydration status), and making the appropriate recommendations for individual safety and activity status.

Clinical Assessment & Diagnosis / Acute Care / Therapeutic Intervention

CIP-4 Perform a comprehensive clinical examination of a patient with an upper extremity, lower extremity, head, neck, thorax, and/or spine injury or condition. This exam should incorporate clinical reasoning in the selection of assessment procedures and interpretation of findings in order to formulate a differential diagnosis and/or diagnosis, determine underlying impairments, and identify activity limitations and participation restrictions. Based on the assessment data and consideration of the patient's goals, provide the appropriate initial care and establish overall treatment goals. Create and implement a therapeutic intervention that targets these treatment goals to include, as appropriate, therapeutic modalities, medications (with physician involvement as necessary), and rehabilitative techniques and procedures. Integrate and interpret various forms of standardized documentation including both patient-oriented and clinician-oriented outcomes measures to recommend activity level, make return to play decisions, and maximize patient outcomes and progress in the treatment plan.

CIP-5 Perform a comprehensive clinical examination of a patient with a common illness/condition that includes appropriate clinical reasoning in the selection of assessment procedures and interpretation of history and physical examination findings in order to formulate a differential diagnosis and/or diagnosis. Based on the history, physical examination, and patient goals, implement the appropriate treatment strategy to include medications (with physician involvement as necessary). Determine whether patient referral is needed, and identify potential restrictions in activities and participation. Formulate and communicate the appropriate return to activity protocol.

CIP-6 Clinically evaluate and manage a patient with an emergency injury or condition to include the assessment of vital signs and level of consciousness, activation of emergency action plan, secondary assessment, diagnosis, and provision of the appropriate emergency care (eg, CPR, AED, supplemental oxygen, airway adjunct, splinting, spinal stabilization, control of bleeding).

Psychosocial Strategies and Referral

CIP-7 Select and integrate appropriate psychosocial techniques into a patient's treatment or rehabilitation program to enhance rehabilitation adherence, return to play, and overall outcomes. This includes, but is not limited to, verbal motivation, goal setting, imagery, pain management, self-talk, and/or relaxation.

CIP-8 Demonstrate the ability to recognize and refer at-risk individuals and individuals with psychosocial disorders and/or mental health emergencies. As a member of the management team, develop an appropriate management plan (including recommendations for patient safety and activity status) that establishes a professional helping relationship with the patient, ensures interactive support and education, and encourages the athletic trainer's role of informed patient advocate in a manner consistent with current practice guidelines.

Healthcare Administration

CIP-9 Utilize documentation strategies to effectively communicate with patients, physicians, insurers, colleagues, administrators, and parents or family members while using appropriate terminology and complying with statues that regulate privacy of medical records. This includes using a comprehensive patient-file management system (including diagnostic and procedural codes) for appropriate chart documentation, risk management, outcomes, and billing.[15]

Appendix B - Integrated Developmental Model of Supervision[158]

Structure	Motivation	Autonomy	Self/Other awareness
level			
1 - Beginning Student	High motivation High anxiety Focus on skills acquisition	Dependent on supervisor need for structure direct feedback wanted minimal direct confrontation	Limited self-awareness Focus on self: anxiety performance Evaluation apprehension Difficulty seeing strengths & weakness
1-CI Response to Beginning Student	Provide structure & guidance Manage anxiety	Mild presenting problems in pt Facilitative (encouragement, supportive) Prescriptive (suggest approach) Conceptual (tie theory to DX)	Skill training, group supervision, readings, closely monitors pts, role play, ALWAYS start with strengths, then weaknesses
2- Intermediate Student	Fluctuating. More complexity: shakes confidence. confusion, despair, vacillation	Dependency-autonomy conflict. Specific help Dependent or evasive Can become assertive and pursue own agenda May only want requested, specific input and feedback	Focus more on client, can empathise. May become enmeshed or confused and lose effectiveness. need balance
2-CI Response to Intermediate Student	Provide less structure to get more confidence	Shake confidence with unfamiliar cases	Interpret parallel process Confrontation Conceptualizations from alternative theories
3-Advanced Student	Stable - but doubts remain Remaining doubts not disabling Total professional identity and how therapist role fits	Firm belief own autonomy Sense of when necessary to seek consultation Knows his/her limitations	Accepts strengths/ weaknesses & awareness is high Can focus on client and process info. Including use of own reactions. Begins to include own responses to client
3-CI Response to Advanced Student	Let student provide structure Focus on prof.development & personal/prof integration Provides minimal structure	Occasionally confront Present provide catalytic responses to block stagnation	Peer supervision Group supervision Strive for integration to bring up weaknesses

Appendix C - Duquesne University IRB Approval

DUQUESNE UNIVERSITY
Office of Research
301 ADMINISTRATION BUILDING . PITTSBURGH, PA 15282-0202

Dr. Joseph C. Kush
Chair, IRB-Human Subjects
Office of Research
Phone (412) 396-6326 Fax (412) 396-5176
E-mail: kush@duq.edu

September 20, 2012

Re: The Relationship of Athletic Training Student Critical Thinking Skills and Clinical Instructor
Supervision Responses: A Pilot Study – (PROTOCOL # 12-121)

Dr. Paula Sammarone Turocy
School of Health Sciences
Duquesne University
Pittsburgh PA 15282

Dear Dr. Sammarone Turocy,

Thank you for submitting the research proposal of you and your student Ms. Michele R. Kabay, to the Institutional Review Board at Duquesne University.

Based on the review of IRB representative Dr. Jason Scibek, and my own review, your study is approved as Exempt based on 45-CFR-46.101.b.1 regarding research conducted in established or commonly accepted educational settings, involving normal educational practices.

The consent form is attached, stamped with IRB approval and expiration date. You should use the stamped form as the original for copies you display or distribute. The approval pertains to the submitted protocol. If you or Ms. Kabay wish to make changes to the research, you must first submit an amendment and receive approval from this office. In addition, if any unanticipated problems arise in reference to human subjects, you should notify the IRB chair before proceeding. In all correspondence, please refer to the protocol number shown after the title above.

This approval will be renewed in one year as part of the IRB's continuing review. You will need to submit a progress report to the IRB at the address shown above. The report will involve supplying answers to a number of questions that will be sent to you. In addition, if you are still using assent/permission forms, you will need to obtain renewed approvals.

When the study is complete, please provide the IRB with a summary, approximately one page. Often the completed study's Abstract suffices. Keep a copy of your research records, other than those you have agreed to destroy for confidentiality, over a period of five years after the study's completion.

Thank you for contributing to Duquesne's research endeavors.

Sincerely yours,
Joseph C. Kush, Ph.D.

C: Dr. Jason Scibek
IRB Records

Appendix D - California Critical Thinking Skills Test

Supplemental Appendix. Not authorized for publication due to copy right.

Descriptions of score for CCTST Total Scores

Superior: This result indicates critical thinking skill that is superior to the vast majority of test-takers. Skills at the superior level are consistent with the potential for more advanced learning and leadership.

Strong: This result is consistent with the potential for academic success and career development.

Moderate: This result indicates the potential for skills related challenges when engaged in reflective problem-solving and reflective decision-making associated with learning or employee development.

Weak: This result is predictive of difficulties with educational and employment related demands for reflective problem-solving and reflective decision-making.

Not Manifested: This result is consistent with possible insufficient test-taker effort, cognitive fatigue, or possible reading or language comprehension issues.

RECOMMENDED CATEGORICAL INTERPRETATIONS Scores	**CCTST Total Score- Categorical Scores**				
	Not Manifested	**Weak**	**Moderate**	**Strong**	**Superior**
CCTST Total Score 100 point version CCTST 2010 Forms	50-62	63-69	70-78	79-85	86 or higher

Categorical Cut Scores for the 2010 CCTST Scale Scores (100 point versions)

RECOMMENDED CATEGORICAL INTERPRETATIONS CCTST Scale Scores	**Form 2010 CCTST Categorical Scores (100 point versions)**				
	Not Manifested	**Weak**	**Moderate**	**Strong**	**Superior**
Analysis	50-62	63-69	70-78	79-85	86-100
Interpretation	50-62	63-69	70-78	79-85	86-100
Inference	50-62	63-69	70-78	79-85	86-100
Evaluation	50-62	63-69	70-78	79-85	86-100
Explanation	50-62	63-69	70-78	79-85	86-100
Inductive Reasoning	50-62	63-69	70-78	79-85	86-100
Deductive Reasoning	50-62	63-69	70-78	79-85	86-100

Appendix E-Athletic Training Student Perception of Clinical Instructor Supervision Response (S-PS)

ATS PERCEPTION OF CLINICAL INSTRUCTOR SUPERVISION®

Based upon my **clinical examination and diagnosis** of a patient/client with an **emergency injury**, when I implement the appropriate emergency care (CPR, supplemental oxygen or spinal stabilization), my assigned clinical instructor

1. Allows me to perform these skills without his/her intervention (independently).
2. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
3. Requires me to provide a rationale for the choices and decisions I make.

When I **obtain and interpret data** related to potentially hazardous environmental conditions and monitor body functions (e.g. blood glucose, peak expiratory flow, hydration status) and **make** appropriate recommendations for activity status and safety, my assigned clinical instructor

4. Allows me to perform these skills without his/her intervention (independently).
5. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
6. Requires me to provide a rationale for the choices and decisions I make.

When I **use baseline general health data** to design, implement, evaluate, and modify a program specific to the performance and health goals of the patient/client, my assigned clinical instructor

7. Allows me to perform these skills without his/her intervention (independently).
8. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
9. Requires me to provide a rationale for the choices and decisions I make.

When I **select, apply, evaluate, and/or modify** standard protective equipment, taping, wrapping, bracing, padding, and other custom devices for the patient/client to prevent and/or minimize risk of injury, my assigned clinical instructor

10. Allows me to perform these skills without his/her intervention (independently).
11. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
12. Requires me to provide a rationale for the choices and decisions I make.

When I **perform a comprehensive clinical examination** of a patient/client with a **Lower Extremity** injury or condition **and** incorporate clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, determine

underlying impairments and identify activity limitation and participation restrictions, my assigned clinical instructor

13. Allows me to perform these skills without his/her intervention (independently).
14. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
15. Requires me to provide a rationale for the choices and decisions I make.

When I **provide appropriate initial care** and establish overall treatment **goals** for a patient/client with a **Head, Thorax, and/or Spine** injury based on the assessment data and patient goals, my assigned clinical instructor

16. Allows me to perform these skills without his/her intervention (independently).
17. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
18. Requires me to provide a rationale for the choices and decisions I make.

As a member of a management team, when I help to **develop an appropriate management plan** that includes recommendations for patients safety and activity status and establish a professional helping relationship, my assigned clinical instructor

19. Allows me to perform these skills without his/her intervention (independently).
20. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
21. Requires me to provide a rationale for the choices and decisions I make.

When I **identify potential restrictions** in activities and participation and then formulate and communicate the appropriate return to activity protocol for a patient/client with **common general medical illness**, my assigned clinical instructor

22. Allows me to perform these skills without his/her intervention (independently).
23. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
24. Requires me to provide a rationale for the choices and decisions I make.

When I **provide appropriate initial care** and establish overall treatment **goals** for a patient/client with an **Upper Extremity** injury based on the assessment data and patient goals, my assigned clinical instructor

25. Allows me to perform these skills without his/her intervention (independently).
26. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
27. Requires me to provide a rationale for the choices and decisions I make.

When I **incorporate behavioral modification strategies** to educate patients/clients to effect health-related change, my assigned clinical instructor

28. Allows me to perform these skills without his/her intervention (independently).

29. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
30. Requires me to provide a rationale for the choices and decisions I make.

When I **develop, implement and monitor prevention strategies** for at-risk individuals to **allow** for safe physical activity (e.g. persons with asthma or history of heat illness), my assigned clinical instructor

31. Allows me to perform these skills without his/her intervention (independently).
32. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
33. Requires me to provide a rationale for the choices and decisions I make.

When I **perform a comprehensive clinical examination** of a patient/client with a **Head, Thorax, and/or Spine** injury or condition **and** incorporate clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, determine underlying impairments and identify activity limitation and participation restrictions, my assigned clinical instructor

34. Allows me to perform these skills without his/her intervention (independently).
35. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
36. Requires me to provide a rationale for the choices and decisions I make.

When **I clinically evaluate** a patient/client with an **emergency injury** (including vital signs, level of consciousness, activation of an EAP, completion a secondary assessment), my assigned clinical instructor

37. Allows me to perform these skills without his/her intervention (independently).
38. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
39. Requires me to provide a rationale for the choices and decisions I make.

When I **perform a comprehensive clinical examination** of a patient/client with an **Upper Extremity** injury or condition **and** incorporate clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, determine underlying impairments and identify activity limitation and participation restrictions, my assigned clinical instructor

40. Allows me to perform these skills without his/her intervention (independently).
41. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
42. Requires me to provide a rationale for the choices and decisions I make.

Based upon clinical examination, history findings and goals of a patient with a **common general medical illness** when I **implement** the appropriate treatment strategy (physician involvement, medication, and/or referral), my assigned clinical instructor

43. Allows me to perform these skills without his/her intervention (independently).
44. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
45. Requires me to provide a rationale for the choices and decisions I make.

When I effectively **communicate** with patients, physicians, insurers, colleagues, administrators and parents/family while using appropriate terminology and medical privacy statutes, my assigned clinical instructor

46. Allows me to perform these skills without his/her intervention (independently).
47. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
48. Requires me to provide a rationale for the choices and decisions I make.

When I **create and implement therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of patients with a **Head, Thorax, and/or Spine** Injury, my assigned clinical instructor

49. Allows me to perform these skills without his/her intervention (independently).
50. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
51. Requires me to provide a rationale for the choices and decisions I make.

When I **integrate and interpret standardized documentation** including patient-oriented outcomes for patient/client with an **Upper Extremity** Injury to recommend activity level, assess progress and make return to play decisions, my assigned clinical instructor

52. Allows me to perform these skills without his/her intervention (independently).
53. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
54. Requires me to provide a rationale for the choices and decisions I make.

When I **administer test procedures** to obtain **baseline** general health data (nutritional habits, physical activity status, and body composition) for a patient/client, my assigned clinical instructor

55. Allows me to perform these skills without his/her intervention (independently).
56. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
57. Requires me to provide a rationale for the choices and decisions I make.

When I **recognize and refer** at-risk patients and/or individuals with **psychosocial** disorders and/or mental health emergencies, my assigned clinical instructor

58. Allows me to perform these skills without his/her intervention (independently).
59. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.

60. Requires me to provide a rationale for the choices and decisions I make.

When I **create and implement therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of patients with a **Lower Extremity** Injury, my assigned clinical instructor

61. Allows me to perform these skills without his/her intervention (independently).
62. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
63. Requires me to provide a rationale for the choices and decisions I make.

When I decide to **refer** my patient/client to **other** medical or health professionals, my assigned clinical instructor

64. Allows me to perform these skills without his/her intervention (independently).
65. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
66. Requires me to provide a rationale for the choices and decisions I make.

When I **integrate and interpret standardized documentation** including patient-oriented outcomes for patients with a **Head, Thorax, and/or Spine** Injury to recommend activity level, assess progress and make return to play decisions, my assigned clinical instructor

67. Allows me to perform these skills without his/her intervention (independently).
68. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
69. Requires me to provide a rationale for the choices and decisions I make.

When I **perform a comprehensive clinical examination** of a patient/client with a **common illness/condition** and incorporate clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, my assigned clinical instructor

70. Allows me to perform these skills without his/her intervention (independently).
71. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
72. Requires me to provide a rationale for the choices and decisions I make.

When I **provide appropriate initial care** and establish overall treatment **goals** for a patient/client with a **Lower Extremity** injury based on the assessment data and patient goals, my assigned clinical instructor

73. Allows me to perform these skills without his/her intervention (independently).
74. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
75. Requires me to provide a rationale for the choices and decisions I make.

When I **create and implement therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of patients with an **Upper Extremity** Injury, my assigned clinical instructor

76. Allows me to perform these skills without his/her intervention (independently).
77. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
78. Requires me to provide a rationale for the choices and decisions I make.

When I **select and integrate psychosocial techniques** (e.g. verbal motivation, goal setting, imagery, pain management and relaxation) into a patients treatment or rehabilitation **program**, my assigned clinical instructor

79. Allows me to perform these skills without his/her intervention (independently).
80. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
81. Requires me to provide a rationale for the choices and decisions I make.

When I **integrate and interpret standardized documentation** including patient-oriented outcomes for patients with a **Lower Extremity** Injury to recommend activity level, assess progress and make return to play decisions, my assigned clinical instructor

82. Allows me to perform these skills without his/her intervention (independently).
83. Places me in learning situations that utilize my strengths and challenge me to address my weaknesses.
84. Requires me to provide a rationale for the choices and decisions I make.

Appendix F - Clinical Instructor Self-Evaluation of Supervision Response (CI-S)

THE CI SELF-EVALUATION OF SUPERVISION OF ATS®

Based upon the ATSs **clinical examination and diagnosis** of a patient with an **emergency injury**, when he/she implements the appropriate emergency care (CPR, supplemental oxygen or spinal stabilization), as his/her CI I

1. Allow the ATS to perform these skills without my intervention (independently).
2. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
3. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **obtains and interprets data** related to potentially hazardous environmental conditions and monitors body functions (e.g. blood glucose, peak expiratory flow, hydration status) and **makes** appropriate recommendations for activity status and safety, as his/her CI I

4. Allow the ATS to perform these skills without my intervention (independently).
5. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
6. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **uses baseline general health data** to design, implement, evaluate, and modify a program specific to the performance and health goals of the patient/client, as his/her CI I

7. Allow the ATS to perform these skills without my intervention (independently).
8. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
9. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **selects, applies, evaluates, and/or modifies** standard protective equipment, taping, wrapping, bracing, padding, and other custom devices for the patient/client to prevent and/or minimize risk of injury, as his/her CI I

10. Allow the ATS to perform these skills without my intervention (independently).
11. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
12. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the **ATS performs a comprehensive clinical examination** of a patient/client with a **Lower Extremity** injury or condition **and** incorporates clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis,

determine underlying impairments and identify activity limitation and participation restrictions, as his/her CI I

13. Allow the ATS to perform these skills without my intervention (independently).
14. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
15. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **provides appropriate initial care** and establishes overall **treatment goals** for a patient/client with a **Head, Thorax, and/or Spine** injury based on the assessment data and patient goals, as his/her CI I

16. Allow the ATS to perform these skills without my intervention (independently).
17. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
18. Require the ATS to provide a rationale for the choices and decisions he/she makes.

As a member of a management team, when the ATS helps to **develop an appropriate management plan** that includes recommendations for A patient/client safety and activity status and establishes a professional helping relationship, as his/her CI I

19. Allow the ATS to perform these skills without my intervention (independently).
20. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
21. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS identifies potential restrictions in activities and participation and then formulates and communicates the appropriate return to activity protocol for a patient/client with a common general medical illness, as his/her CI I

22. Allow the ATS to perform these skills without my intervention (independently).
23. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
24. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **provides appropriate initial care** and establishes overall treatment **goals** for a patient/client with an **Upper Extremity** injury based on the assessment data and patient goals, as his/her CI I

25. Allow the ATS to perform these skills without my intervention (independently).
26. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
27. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **incorporates behavioral modification strategies** to educate patients/clients to effect health-related change, as his/her CI I

28. Allow the ATS to perform these skills without my intervention (independently).

29. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
30. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **develops, implements and monitors prevention strategies** for at-risk individuals to **allow** for safe physical activity (e.g. persons with asthma or history of heat illness), as his/her CI I

31. Allow the ATS to perform these skills without my intervention (independently).
32. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
33. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **performs a comprehensive clinical examination** of a patient/client with a **Head, Thorax, and/or Spine** injury or condition and incorporates clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, determine underlying impairments and identify activity limitation and participation restrictions, as his/her CI I

34. Allow the ATS to perform these skills without my intervention (independently).
35. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
36. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **clinically evaluates** a patient/client with an **emergency injury** (including vital signs, level of consciousness, activation of an EAP, completion a secondary assessment), as his/her CI I

37. Allow the ATS to perform these skills without my intervention (independently).
38. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
39. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **performs a comprehensive clinical examination** of a patient/client with an **Upper Extremity** injury or condition and incorporates clinical reasoning to select correct assessment procedures and interprets the findings to formulate a diagnosis, determine underlying impairments and identify activity limitation and participation restrictions, as his/her CI I

40. Allow the ATS to perform these skills without my intervention (independently).
41. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
42. Require the ATS to provide a rationale for the choices and decisions he/she makes.

Based upon clinical examination, history findings and goals of a patient/client with a **common general medical illness** when the ATS **implements** the appropriate **treatment** strategy (physician involvement, medication, and/or referral), as his/her CI I

43. Allow the ATS to perform these skills without my intervention (independently).
44. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
45. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS effectively **communicates** with patients, physicians, insurers, colleagues, administrators and parents/family while using appropriate terminology and medical privacy statutes, as his/her CI I

46. Allow the ATS to perform these skills without my intervention (independently).
47. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
48. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **creates and implements therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of a patient/client with a **Head, Thorax, and/or Spine** Injury, as his/her CI I

49. Allow the ATS to perform these skills without my intervention (independently).
50. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
51. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **integrates and interprets standardized documentation** including patient-oriented outcomes for patients with an **Upper Extremity** Injury to recommend activity level, assess progress and make return to play decisions, as his/her CI I

52. Allow the ATS to perform these skills without my intervention (independently).
53. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
54. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **administers test procedures** to obtain **baseline** general health data (nutritional habits, physical activity status, and body composition) for a patient/client, as his/her CI I

55. Allow the ATS to perform these skills without my intervention (independently).
56. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
57. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **recognizes and refers** at-risk patients and/or individuals with **psychosocial** disorders and/or mental health emergencies, as his/her CI I

58. Allow the ATS to perform these skills without my intervention (independently).
59. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
60. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the **ATS creates and implements therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of a patient/client with a **Lower Extremity** Injury, as his/her CI I

61. Allow the ATS to perform these skills without my intervention (independently).
62. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
63. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS decides to **refer** the patient/client to **other** medical or health professionals, as his/her CI I

64. Allow the ATS to perform these skills without my intervention (independently).
65. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
66. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **integrates and interprets standardized documentation** including patient-oriented outcomes for a patient/client with a **Head, Thorax, and/or Spine** Injury to recommend activity level, assess progress and make return to play decisions, as his/her CI I

67. Allow the ATS to perform these skills without my intervention (independently).
68. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
69. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **performs a comprehensive clinical examination** of a patient/client with a **common illness/condition** and incorporates clinical reasoning to select correct assessment procedures and interpret the findings to formulate a diagnosis, as his/her CI I

70. Allow the ATS to perform these skills without my intervention (independently).
71. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
72. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **provides appropriate initial care** and establish overall treatment **goals** for a patient/client with a **Lower Extremity** injury based on the assessment data and patient goals, as his/her CI I

73. Allow the ATS to perform these skills without my intervention (independently).
74. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
75. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **creates and implements therapeutic intervention** (i.e. therapeutic exercise, modalities, and medication) that targets treatment goals of a patient/client with an **Upper Extremity** Injury, as his/her CI I

76. Allow the ATS to perform these skills without my intervention (independently).
77. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
78. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the **ATS selects and integrates psychosocial techniques** (e.g. verbal motivation, goal setting, imagery, pain management and relaxation) into a patient/client treatment or rehabilitation **program**, as his/her CI I

79. Allow the ATS to perform these skills without my intervention (independently).
80. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
81. Require the ATS to provide a rationale for the choices and decisions he/she makes.

When the ATS **integrates and interprets standardized documentation** including patient-oriented outcomes for a patient/client with a **Lower Extremity** Injury to recommend activity level, assess progress and make return to play decisions, as his/her CI I

82. Allow the ATS to perform these skills without my intervention (independently).
83. Place the ATS in learning situations that utilize his/her strengths and challenge him/her to address his/her weaknesses.
84. Require the ATS to provide a rationale for the choices and decisions he/she makes.

Appendix G - Demographics Forms

ATS Id # Label

ATHLETIC TRAINING STUDENT DEMOGRAPHIC FORM

Verify the ID # on the Demographic Form with the ID # on the packet cover.

Answer the following:

1. Your Age: Years_____

Circle your response for the following questions:

2. **Your Gender:** Male Female

3. **Total number of academic years completed in higher education (after high school)**
   0 1 2 3 4 5 6 7 8 9
4. **Total number of academic years completed at current institution**
   0 1 2 3 4 5 6 7 8 9
5. **Total number of clinical experiences completed with an assigned CI before the current clinical assignment: _____**

6. **Are you currently or have you been employed in a paid or unpaid position in the last 5 years?**
   Circle: No if no, move on to question 7
   Yes if yes, complete chart

POSITION	DURATION	PART-TIME	FULL-TIME	WEEKENDS	SUMMER	BREAKS	WORK(ED) INDEPENDENTLY
Example: Babysitter	2 years	xx			xx	xx	xx

7. Have you been a member of a service organization in the last 5 years?

(Examples: scouts, military, youth group, AT student organization)

Circle: No if no, move on to question 8

Yes if yes, complete chart

POSITION/ORGANIZATION	DURATION	CAPACITY
Example: Boy Scout	5 years	Eagle Scout

8. Have you been a leader of a service organization in the last 5 years?

(Examples: scout master, military officer, youth group leader, Sunday school teacher)

Circle: No if no, move on to question 9

Yes if yes, complete chart

POSITION/ORGANIZATION	DURATION	
Example: Scout Master	2 years	2-4 years ago
Example: AT Student Organization Treasurer	1 year	current

9. Have you worked independently in a health related profession in the last 5 years?

(other than your AT education experience)

(Examples: hospital aid, EMT, intern, candy striper, medical assistant, PT aid)

Circle: No if no, move on to question 10

Yes if yes, complete chart

POSITION/ORGANIZATION	DURATION	CAPACITY
Example: EMT	1 year	Volunteer

For the purpose of this study, the following will apply:

Critical thinking is *purposeful, evaluative, and reflective thinking that explicitly aims at well-founded judgment, in an attempt to determine the true worth, merit, or value of something.*[16]

10. **Indicate your current level of ability to critically think by checking the appropriate line. Please check only one response.**

_____Difficulties with educational and employment related demands for reflective problem-solving and reflective decision-making.
_____ Potential for challenges when engaged in reflective problem-solving and reflective decision-making.
_____ Consistently able to engage in reflective problem-solving and reflective decision-making.
_____ Confident that I am advanced as engaging in reflective problem-solving and reflective decision-making.

Return this form along with the completed survey to the proctor.

Thank you again for your participation.

ID # _____

CLINICAL INSTRUCTOR DEMOGRAPHIC FORM

Be sure that your ID number Matches the number on the cover sheet

Complete the following:

1. **Your Age:** Years_____

2. **Your Gender (check one):** _____ Male _____ Female

3. **Your Profession** (list primary role for CI with ATEP): example: AT, PT, _____

4. **Your route to AT certification:**
   Circle: Internship Curriculum

5. **Number of years you have been a Clinical Instructor for <u>ANY</u> Athletic Training Education Program:**
   _____ Total number

6. **Do you currently supervise AT students for more than one Athletic Training Education Program?**
   Circle: No if no, move on to question 7
   Yes if yes, complete chart

ATEP	**DURATION**
Grant University (example)	5 years
Atlanta University (example)	2 years

7. **Please <u>estimate</u> the number of athletes/patients you provide athletic training services for on a <u>daily</u> basis during fall 2012 while supervising athletic training students**
   _____

8. Are you responsible to supervise any other students/aids, other than AT students, <u>during</u> your AT clinical services?

Circle: No if no, move on to question 9
Yes if yes, complete chart

NUMBER OF SUPERVISEES	CAPACITY/TYPE OF SUPERVISEE
2	Student managers

9. Have you ever been responsible for the day to day rearing of children for a time frame of more than one year?

Circle: No if no, move on to question 10
Yes if yes, complete chart

NUMBER OF CHILDREN	CAPACITY
2	Parent 3 years, 12 years
1	Niece, lived with my parents & I for 6 years

10. During the past 6 years, have you supervised others (all ages)? (Example: Scout leader, Sunday school teacher, camp counselor)

Circle: No if no, move on to question 11
Yes if yes, complete chart

POSITION/ORGANIZATION	DURATION	Child, Adolescent, Adult
Example: Scout Leader	5 years	child
Example: Sunday school teacher	2 years	adolescent

11. Have you ever had formal training/education as a clinical instructor of athletic training student(s)?

Circle: No if no, move on to question 12
Yes if yes, **<u>list</u>** type of education (Example: ACI Training, CIE Training)

12. Have you ever had any formal post-graduate or professional training as an educator?

Circle: No if no, move on to question 13
Yes if yes, complete chart

TRAINING
Example: AT Educators Conference, Masters in Education, Teaching Certificate

13. Have you ever been a teacher/instructor in a formal academic setting?

Circle: No if no, move on to question 14
Yes if yes, complete chart

Position
CPR instructor, College instructor for Phys Ed.

14. Have you ever had any formal military training? (Example: ROTC, National Guard, Active/Reserve)

Circle: No
Yes if yes, complete chart

BRANCH/PROGRAM
Example: United States Army

Return this form along with the completed survey in the envelope provided.

Appendix H - Table of Specifications

CIP #	CONTENT	CRITERIA	? NUMBER
CIP 1	General health baseline test Design, implementation, evaluation and modification of program specific to performance and health goals of patient. Incorporate contemporary behavioral change theory when educating clients and individuals to effect health-related change. Refer to other medical and health professionals when appropriate.	MOTIVATION SELF AWARE AUTONOMY	55, 7, 28, 64 56, 8, 29, 65 57, 9, 30, 66
CIP 2	Select, apply, evaluate, and modify appropriate standard protective equipment, taping, wrapping, etc. to prevent and /or minimize the risk of injury to the head, torso, spine, and extremities for safe participation in sport or other physical activity.	MOTIVATION SELF AWARE AUTONOMY	10 11 12
CIP 3	Develop, implement, and monitor prevention strategies for at-risk individuals and large groups to allow safe physical activity in a variety of conditions. This includes obtaining and interpreting data related to potentially hazardous environmental conditions, monitoring body functions and making the appropriate recommendations for individual safety and activity status.	MOTIVATION SELF AWARE AUTONOMY	31, 4 32, 5 33, 6
CIP 4	Clinical Exam LE		
	Perform a comprehensive clinical examination of a patient with a lower extremity injury or condition. Based on the assessment data and consideration of the patient's goals, provide the appropriate initial care and establish overall treatment goals. Create and implement a therapeutic intervention that targets these treatment goals (with physician involvement as necessary), and rehabilitative techniques and procedures. Integrate and interpret various forms of standardized documentation including both patient-oriented and clinician-oriented outcomes measures to recommend activity level, make return to play decisions, and maximize patient outcomes and progress in the treatment plan.	MOTIVATION SELF AWARE AUTONOMY	13, 73, 61, 82 14, 74, 62, 83 15, 75, 63, 84
CIP 4	Clinical Exam UE	MOTIVATION SELF AWARE AUTONOMY	40, 25, 76, 52 41, 26, 77, 53 42, 27, 78, 54
	Perform a comprehensive clinical examination of a patient with an upper extremity injury or condition. Based on the assessment data and consideration of the patient's goals, provide the appropriate initial care and establish overall treatment goals. Create and implement a therapeutic intervention that targets these treatment goals (with physician involvement as necessary), and rehabilitative techniques and procedures. Integrate and interpret various forms of standardized documentation including both patient-oriented and clinician-oriented		

	outcomes measures to recommend activity level, make return to play decisions, and maximize patient outcomes and progress in the treatment plan.		
CIP 4	Clinical Exam Spine	MOTIVATION SELF AWARE AUTONOMY	34, 16, 49, 67 35, 17, 50, 68 36, 18, 51, 69
	Perform a comprehensive clinical examination of a patient with a, head, neck, thorax, and/or spine injury or condition. Based on the assessment data and consideration of the patient's goals, provide the appropriate initial care and establish overall treatment goals. Create and implement a therapeutic intervention that targets these treatment goals (with physician involvement as necessary), and rehabilitative techniques and procedures. Integrate and interpret various forms of standardized documentation including both patient-oriented and clinician-oriented outcomes measures to recommend activity level, make return to play decisions, and maximize patient outcomes and progress in the treatment plan.		
CIP 5	Perform a comprehensive clinical examination of a patient with a common illness/condition that includes appropriate clinical reasoning in the selection of assessment procedures and interpretation of history and physical examination findings in order to formulate a differential diagnosis and/or diagnosis. Based on the history, physical examination, and patient goals, implement the appropriate treatment strategy to include medications (with physician involvement as necessary). Determine whether patient referral is needed, and identify potential restrictions in activities and participation. Formulate and communicate the appropriate return to activity protocol.	MOTIVATION SELF AWARE AUTONOMY	70, 43, 22 71, 44, 23 72, 45, 24
CIP 6	Clinically evaluate and manage a patient with an emergency injury or condition to include the assessment of vital signs and level of consciousness, activation of emergency action plan, secondary assessment, diagnosis, and provision of the appropriate emergency care	MOTIVATION SELF AWARE AUTONOMY	37, 1 38, 2 39, 3
CIP 7	Select and integrate appropriate psychosocial techniques into a patient's treatment or rehabilitation program to enhance rehabilitation adherence, return to play, and overall outcomes. This includes, but is not limited to, verbal motivation, goal setting, imagery, pain management, self-talk, and/or relaxation.	MOTIVATION SELF AWARE AUTONOMY	79 80 81

CIP 8	Demonstrate the ability to recognize and refer at-risk individuals and individuals with psychosocial disorders and/or mental health emergencies. As a member of the management team, develop an appropriate management plan (including recommendations for patient safety and activity status) that establishes a professional helping relationship with the patient, ensures interactive support and education, and encourages the athletic trainer's role of informed patient advocate in a manner consistent with current practice guidelines.	MOTIVATION SELF AWARE AUTONOMY	58, 19 59, 20 60, 21
CIP 9	Utilize documentation strategies to effectively communicate with patients, physicians, insurers, colleagues, administrators, and parents or family members while using appropriate terminology and complying with statues that regulate privacy of medical records. This includes using a comprehensive patient-file management system (including diagnostic and procedural codes) for appropriate chart documentation, risk management, outcomes, and billing.[15]	MOTIVATION SELF AWARE AUTONOMY	46 47 48

Appendix I - Program Director Information Packet

Program Director Packet

Instructions

Thank you for agreeing to assist in the survey research being conducted as part of my dissertation. Enclosed are three forms for you to complete and return so that I can begin to compile the survey packets for the athletic training students and clinical instructors at your institution.

Understanding that the most recent CAATE standards have been published with an update of a Preceptor supervising the ATS during clinical education experiences, the documents used for the survey continue to use the term Clinical Instructors only because all participants may not be familiar with the Preceptor definition at the time of completing the survey.

Complete & Return the enclosed forms in the envelope provided.

- Participation and Confidentiality Agreement
- Program Information Form
- PD Matrix Form
- AT Student Clinical Assignment Table

If at any time you have questions about the study or the information you are asked for, contact the primary investigator, Paula Turocy at turocyp@duq.edu or 412-396-5695

PARTICIPATION AND CONFIDENTIALITY AGREEMENT

I agree to assist in the data collection process for the study titled The Relationship Between Athletic Training Student Critical Thinking Skills and Clinical Instructor Supervision: A Pilot Study.

This process includes the following:

1. Complete all documents required from the program director (attached forms).

2. Recruit ATS and CIs from the ATEP to volunteer to participate in the research project.

3. Assure the eligible participants that their participation is voluntary and if they chose to not participate or withdraw from the study at any time there will be no repercussion of any type for that decision.

4. Proctor survey sessions for eligible ATS who have volunteered to participate in the study during the specified time period. Data collection periods will occur two times during the fall term.

5. Verifying the delivery and return of the CI supervision survey to the CI's who are assigned ATS from the ATEP.

6. Return all documents in a timely manner to the designated investigator.

7. Maintain confidentiality of all documents by not reviewing the completed surveys prior to returning them to the primary investigator. All documents will be placed into the return envelope by the ATS or CI and not removed for any reason prior to returning the documents. All completed documents will be stored in a secure location until they are mailed to the primary investigator. No completed documents will be copied for any reason.

I have read the above statements and understand what is being requested of me. I understand that my participation and the participation of the ATS and CI at this institution is voluntary and I am free to withdraw my consent at any time, for any reason. On these terms, I certify that I am willing to assist in this research project. I agree to participate in the process as described above and will maintain the confidentiality of the participants from this institution.

I understand the should I have any further questions about the study I may call Paula Turocy at 412-396-5695.

_____

Program Director Name (Print)

_____

_____

Program Director Signature Date

ATHLETIC TRAINING EDUCATION PROGRAM INFORMATION

Institution Name_____ Your Name _____

Institution Term Structure (circle one)**:** Semester Tri-mester Other (specify)

Please complete and return the following documents:

- Program Information Form (this form attached)
- PD Matrix Form (Excel document attached)
- Student Clinical Assignment Table (Word document attached)

Provide complete information table below:

To schedule the appropriate survey dates, please provide the inclusive dates of your fall clinical education experiences. If different levels of students have different start dates, please delineate each on a separate line of the table. To be listed, an AT Student (ATS) must be enrolled in a clinical education course, be actively engaged in clinical education, and be assigned to a clinical instructor for a specific time interval.

Academic Year of ATS	**Clinical Year of ATS**	**First day of clinical education for Fall 2012**	**Last day of clinical education for Fall 2012**	**Comments** (Please indicate whether pre-season is optional or required)
Examples:				
Sophomore	*First*	*Oct 1*	*Dec 7*	
Junior	*Second/2*	*Aug 30 -*	*Nov 12 approx date*	*Preseason optional - Fall season*
Senior	*3*	*Aug 12*	*Dec 7*	*Preseason mandatory for class*

OVER

1. Please identify a contact person(s), if other than the Program Director, for survey distribution. This individual will distribute, collect, and be responsible to mail the materials back to Michele Kabay:

Contact Person Name & Position _____

Contact Person Phone_____

Contact Person Email _____

2. Please describe the earliest BOC Exam timeframe that you authorize your graduating ATS to sit for the BOC exam and the rationale for that choice:

Example: *April since it is the closest to the students' graduation date.*

3. Please indicate whether IRB approval will be needed from your institution's IRB to conduct this study:

(Circle)Yes No, we will accept Duquesne IRB approval

If institutional IRB approval is required, please provide the following information for IRB contact:

Institution's IRB Contact Name_____

IRB Contact Title:_____

IRB Contact Phone:_____

IRB Contact Email _____

Please return completed:

Participation and Confidentiality Agreement
(hard copy needs returned with original signature)
ATEP Information (this form)
Matrix for PD
Clinical Assignment Table

to:

turocyp@duq.edu as attachments – preferred
OR send to:
Paula Turocy, ATC
Duquesne University Athletic Training
122 Health Science Building
600 Forbes Ave
Pittsburgh, PA 15282