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Identification of Instructional Strategies Within Athletic Training Curricula and the Impact of Best-Practices on First-Attempt Board of Certification Pass Rate

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by

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Dr. Cynthia Schroeder, Committee Member — 12/2/2016 Date

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

This purpose of this study was twofold: (1) investigate effective instructional strategies for athletic training education, and (2) investigate a correlation between research-based instructional strategies and first attempt success on the Board of Certification (BOC) examination. Research based instructional strategies exist within allied health education, however, no previous research set out to specifically identify instructional strategies which lead to first attempt success on the BOC examination. Therefore, a mixed-method investigation of research based instructional strategies was performed, and correlation data between instructional strategies and success on the BOC examination were collected. Data produced by the study revealed that instructional strategies based on feedback and metacognition, inductive instruction, and teacher-centered instruction correlate to first attempt success on the BOC examination. In addition, data produced also suggests that a prevalent misconception of the perceptions of instructional strategies exists between athletic training students and athletic training instructors. Based on the data presented, researcher recommends the use of a blended design to instruction, which allows for guided instructions, feedback interactions, and frequent meta-cognitive development opportunities for the athletic training student.

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Chapter One: Introduction

Overview

Athletic trainers are certified and licensed health care professionals who specialize in the care of prevention of athletic injuries. The profession of athletic training is formally recognized by the American Medical Association, and athletic trainers are employed in several distinct settings, providing a crucial service to their respective patient populations. Many athletic trainers serve as the first line of defense for the athletic population, providing emergency care for potentially life-threatening injuries when necessary. Providing this level of care requires an integrative and comprehensive educational process, as services provided by the professional athletic trainer may be the difference between life and death for their patients. In order to become an athletic trainer, an individual must progress through a credentialed professional athletic training education program, and successfully pass the Board of Certification (BOC) examination. It is the responsibility of the athletic training education program to prepare students for success on the BOC examination, and more importantly, for success in the field as a professional athletic trainer.

Purpose

The purpose this study was to examine research-based instructional strategies throughout athletic training education programs within the United States. The study also investigated a potential correlation between student identified instructional strategies and first-attempt success rate on the athletic training BOC examination. In order to examine research-based instructional strategies within current athletic training education programs, athletic training students and instructors were surveyed, utilizing the

Instructional Strategy Intake Instrument (ISII). A quantitative statistical analysis compared athletic training instructor and athletic training student responses. All qualitative data was transcribed and coded using a form of thematic analysis. Through an analysis of the instructional strategies from the viewpoint of both the athletic training student and the athletic training instructor, the researcher identified a profile of best-practice instructional strategies that likely lead to high passing rates on the BOC examination (see Figure 2).

Rationale

The allied health care profession of athletic training continues to grow, and as an increasing number of young individuals prepare to enter the professional work force, it is essential that quality instruction be delivered throughout athletic training education curricula. Currently, the final assessment of competency for the athletic training student is the BOC examination, a summative assessment based on the Role Delineation Study/Practice Analysis, which reviews current knowledge and skill requirements for entry-level athletic trainers (Board of Certification, 2012; National Athletic Training Association, n.d.a.; Potteiger & Lundgren, 2012). Successful completion of this examination, determined through a composite score of at least 500 on a scale of 200-800, enables the athletic training student to practice as a fully certified professional athletic trainer anywhere in the country (Board of Certification, 2012). However, current literature has identified unforeseen difficulties for emergent athletic trainers working in specific settings not currently addressed in athletic training curricula (Dodge, Mazerolle, & Bowman, 2014). Therefore, athletic training education programs need to ensure that students are adequately prepared for both the BOC examination and for success as

athletic training professionals. Athletic training is a relatively young profession in comparison to other allied health professions; therefore, current literature related to athletic training education is limited. Research related to student perceptions of athletic training programs demonstrate a correlation between perceived academic stressors and first-attempt pass rate on the BOC examination (Breitbach, Downey, & Frager, 2013). Research has also demonstrated a correlation between student discernment of self-confidence and the ability to enter the professional workforce (Morin, Misasi, David, Hannah, & Rothbard, 2014). However, research related to the impact of instructional strategies utilized within athletic training educations programs and performance on the BOC could not be located.

The clinical setting is a unique aspect of athletic training education, and it distinguishes the educational process of the professional athletic trainers from other higher education areas of study. To this end, limited literature details the clinical integration aspect of the athletic training education curriculum. "Teachable moments" within the clinical setting have been acknowledged (Benes, Mazerolle, & Bowman, 2014; Rich, 2009), and the contributing characteristics of a positive clinical preceptor were identified (Curtis, Helion, & Domsohn, 1998). Effective means for evaluating student proficiency within the clinical setting have also been suggested (Walker, Weidner & Armstrong, 2008); however, current literature has failed to identify specific research-based instructional strategies within athletic training curricula.

Outside of athletic training, a great deal of research exists regarding the implementation and effectiveness of instructional strategies across various educational levels and content areas. Hattie (2009) produced an impactful meta-analysis of

instructional strategies commonly employed throughout all levels of education, and created a ranking system of each instructional strategy and their contribution on student achievement. The conceptual principles originally produced by Hattie (2009) permeate throughout higher education and within allied health education programs. Specifically, higher education literature within allied health fields have promoted the use of instructional strategies involving peer-influences, inductive teaching, feedback and meta-cognitive instruction, and direct instruction throughout their respective curricula (Heinerichs & Curtis, 2006; Henning, Wallhead, & Brya, 2010; Prince & Felder, 2007; Reig & Wilson, 2009). Interestingly, current literature in the field fails to document effective instructive strategies that lead to success on the athletic training BOC examination. To confront this issue, the current research project and hypotheses proposed to identify effective instructional strategies conducive to success in allied health education programs.

Research Questions and Hypotheses

RQ1: What is the perception of "peer-influence" centered instructional strategies among athletic training students and athletic training instructors?

RQ2: What is the perception of "feedback and meta-cognitive" instructional strategies among athletic training students and athletic training instructors?

RQ3: What is the perception of "inductive" instructional strategies among athletic training students and athletic training instructors?

RQ4: What is the perception of "teacher-centered" instructional strategies among athletic training students and athletic training instructors?

Hypothesis 1: There is a relationship between the prevalence of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 2: There is a relationship between the quality of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 3: There is a relationship between the prevalence of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 4: There is a relationship between the quality of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 5: There is a relationship between the prevalence of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 6: There is a relationship between the quality of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 7: There is a relationship between the prevalence of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 8: There is a relationship between the quality of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Hypothesis 9: There is a difference between the perception of instructional strategies between athletic training students and athletic training instructors.

Limitations

A mixed- method approach was utilized by the researcher in an attempt to gain a holistic view of the learning experience from the perception of both the athletic training student and the athletic training instructor. However, as with all studies of this nature, there are certain limitations to the research performed. The nature of qualitative research is subject to researcher bias, and, while the researcher attempted to eliminate any bias throughout the data collection and analysis portion of the research process, the possibility for bias was noted.

For data collection purposes, the researcher utilized a sampling frame provided by the Board of Certification, which maintains updated records of all athletic training instructors and BOC examination test takers. Therefore, the researcher did not have direct control of the participant verification process. Prior to undertaking the study, the Instructional Strategy Intake Instrument (ISII) underwent a pilot test with practicing athletic training educators to check for clarity and cohesiveness. However, athletic training students were required to self-report BOC examination scores in a range format; therefore, honesty may have played a factor. In addition, while the response rate for the survey met pre-established methodology minimums and allowed for quantitative analyses, a larger sample size would have yielded results that are more generalizable.

Definition of Terms

Athletic training education program – Any professional educational program accredited by the Commission on the Accreditation of Athletic Training Education (CAATE) (Board of Certification, 2015).

Athletic training student (ATS) – Any student enrolled within a CAATE accredited program (Board of Certification, 2015).

Athletic training instructor – Any individual responsible for teaching within the core athletic training curricula of a CAATE accredited program (National Athletic Trainer's Association, n.d.a.).

Board of Certification (BOC) – An independent, non-profit organization responsible for the certification of all professional athletic trainers within the United States (Board of Certification, 2015).

Board of Certification (BOC) examination – National examination regulated by the Board of Certification; "the examination is based on the BOC Role Delineation Study/Practice Analysis, which examines the current knowledge, skills, and abilities required for entry-level ATs" (Potteiger & Lundgren, 2012, p. 198).

Certified athletic trainer (ATC) – Any individual who has completed an athletic training education program and successfully passed the BOC examination (National Athletic Trainer's Association, n.d.a.).

Clinical education – CAATE defined clinical education as, "the application of knowledge and skills, learned in classroom and laboratory settings, to actual practice on patients under the supervision of an approved clinical instructor" (National Athletic Trainers' Association, n.d.a., para. 14).

Commission on Accreditation of Athletic Training Education (CAATE) – American Medical Association approved educational organization responsible for the oversight of athletic training education (Prentice, 2014).

Content areas – CAATE designated educational categories, divided into evidence-based practice, prevention and health promotion, clinical examination and diagnosis, acute care of injury and illness, therapeutic interventions, psychosocial strategies and referral, healthcare administration, and professional development and responsibility (National Athletic Trainers' Association, 2011).

Feedback and meta-cognitive strategies – Any instructional strategy that requires the learner to receive feedback, from either an instructor or a peer, and use said feedback to alter their thinking processes (Mackey, Kamphoff, & Armstrong, 2010).

First-attempt pass rate – "Candidates passing the entire [Board of Certification] examination on the first attempt" (Breitbach et al., 2013, p. 11). A successful pass on the BOC examination requires a minimum composite score of 500 on a scale of 200-800 (Board of Certification, 2015).

Inductive teaching – Any instructional strategy that involves presenting the student with a specific challenge, and requiring the student to solve said challenge in their own unique way (Prince & Felder, 2007).

Instructional strategies – For the purposes of this study, the term "instructional strategies" describes any instructional method utilized by an instructor within an athletic training education program. The following instructional strategies were investigated during the course of this study: peer influences, feedback & meta-cognitive strategies, inductive teaching, and teacher-centered instruction (Hattie, 2009).

Instructional Strategy Intake Instrument (ISII) – Survey, originally created by the researcher, intended to measure the prevalence and quality of instructional strategies within athletic training education programs. Two versions of the survey were administered: athletic training student version and athletic training instructor version.

Peer-influences – Any instructional strategy, which involves students interacting with one another in a structured and purposeful manner. Specific examples of peer-influences include reciprocal teaching, peer-tutoring, and peer-assessment (Henning et al., 2010; Marty, Henning & Willse, 2010).

Prevalence - For the purposes of this study, prevalence refers to the frequency in which each instructional strategy occurs in the educational setting. Prevalence will be measured using the following 4-point Likert scale: never (0 times), sometimes (1-10 times), often (11-20 times), and very often (more than 20 times).

Quality – For the purposes of this study, quality refers to the ability of each instructional strategy to prepare the athletic training student for success on the Board of Certification examination. Quality will be measured using the following 5-point Likert scale: 1= Extremely unhelpful, 2= unhelpful, 3= no opinion, 4= helpful, and 5= extremely helpful.

Teacher-centered instructional strategies – Any instructional strategy where the instructor utilizes a traditional, didactic based approach to education (Hattie, 2009).

Summary

While guidance on the content instructed throughout the athletic training education curriculum exists, there is no current literature regarding the manner in which said instruction is to take place. However, CAATE does require that university athletic

training education programs maintain a specific BOC examination pass rate among all graduating students in order to maintain institutional accreditation. This pass rate, a first-attempt success rate as well as a three-year aggregate score, places pressure on the educational practices of each program (National Athletic Trainers' Association Board of Directors, 2013). Therefore, the purpose of this study was to investigate commonly employed instructional strategies throughout athletic training education curricula, and correlate specific research-based strategies to first-attempt success on the BOC examination. By identifying the effective research-based instructional strategies throughout athletic training education curricula, programs may be able to increase the first-attempt pass rate of their students on the BOC examination.

Chapter Two: The Literature Review

Athletic Training Background

In order to appreciate the educational process that athletic trainers undergo, it is imperative to identify systematically the roles and responsibilities of the professional athletic trainer. These roles and responsibilities have transformed over the years, which significantly influenced the current description of the profession. According to the National Athletic Trainers' Association (n.d.a.), "[a]thletic trainers are healthcare professionals who collaborate with physicians. The services provided by athletic trainers include prevention, emergency care, clinical diagnosis, therapeutic intervention and rehabilitation of injuries and medical conditions" (para. 1). Prentice (2014) expanded on the definition of an athletic trainer by alluding to the importance of the athletic trainer in the sports medicine field. Prentice, who would publish *Principles of Athletic Training: A Competency-Based Approach*, a standard textbook utilized in several athletic training education programs across the country, stated "athletic trainers provide a critical link between the medical community and individuals who participate in all physical activity (p. 3). Furthermore, "[i]n June 1990, the American Medical Association officially recognized athletic training as an allied health care profession" (Prentice, 2014, p. 31). Recognition from a nationally reputable organization such as the American Medical Association aided to the validation of athletic trainers as professional health care providers. The extensive occupational description combined with the acknowledgement from a national healthcare organization helps the individual understand the complexity of the profession, and the importance of a structured and rigorous educational process.

Roles and Responsibilities

In order to understand the full scope of practice for the professional athletic trainer, it is important to appreciate how the profession of athletic training functions as a member of the health care community. Athletic trainers practice in a field of medicine commonly known as sports medicine, and according to Prentice (2014), "sports medicine refers generically to a broad field of health care related to physical activity and sport" (p. 5). Potteiger (2014) utilized a similar, broad approach to define sports medicine, referring to sports medicine as "an umbrella term used to describe all of the various issues interrelated among medicine, physical activity, exercise, health promotion, and disease prevention" (p. 148). Loosely crafted definitions such as this appeared in the previous work of MacAuley, Moorman, and Bytomski (2010) who described the "multi-faceted team" approach to sports medicine. MacAuley et al. (2010) stated that the sports medicine team "include[ed] physicians, athletic trainers, physical therapists, and sports psychologists" (p. vii). As the field of sports medicine developed, the need for areas of specialization became apparent and more easily defined.

Regarding areas of specialization, Prentice (2014) categorized specific areas of related to the field of sports medicine under two categories: performance enhancement and injury care and management. Areas of specialization categorized under performance enhancement include exercise physiology, biomechanics, sports psychology, sports nutrition, strength and conditioning, coaching, and personal fitness training (Prentice, 2014). Areas of specialization categorized under injury care and management include the practice of medicine, athletic training, sports physical therapy, sports massage therapy, sports dentistry, osteopathic medicine, orthotics/prosthetics, sports chiropractics, sports

podiatry, and emergency medical technician (Prentice, 2014). In the researcher's experience as a healthcare professional, the ability to recognize athletic trainers as specialists within the injury care and management category of sports medicine assists in the delineation of roles and responsibilities for the profession.

Domains of Athletic Training

The governing document, which outlines the role and responsibilities of the professional athletic trainer, is known as the role delineation study (Prentice, 2014). The role delineation study serves as a guiding document for professional athletic trainers, dividing their roles into five domains of practice: (1) injury/ illness prevention and wellness protection, (2) clinical evaluation and diagnosis, (3) immediate and emergency care, (4) treatment and rehabilitation, and (5) organizational and professional health and well-being (Johnson, 2010). The role delineation study is a crucial document for the profession of athletic training, serving both as a platform from which all state practice acts are created, and as a foundation for educational competencies which dictate athletic training education curricula nationwide.

Although the specific roles and responsibilities of the athletic trainer differ from setting to setting, none is more important or more defining than the athletic trainers' task to prevent and manage injuries, which correlates to domain 1 of the role delineation study (injury/ illness prevention and wellness protection). The Board of Certification (2012) provided a detailed description of domain 1, stating that athletic trainers must be able to "educat[e] participants and manag[e] risk for safe performance and function" (p. 2). According to the Board of Certification (2012), "a key aspect of the athletic education and training is in the area of prevention and risk management. The [athletic trainer] is the

front-line professional charged with this duty" (p. 2). Prentice (2014) stated, "of all the professionals charged with injury prevention and health care provision for an injured patient, perhaps none is more intimately involved than the athletic trainer (p. 13). Potteiger (2014) expressed a similar sentiment, stating, "the main responsibilit[y] of an athletic trainer is to make sure that the level of risk for injury is as low as possible" (p. 156). This primary responsibility of injury prevention and management has become a cornerstone in the public identity for the professional athletic trainer. Several athletic training position statements have been developed to provide guidance and recommendations to practicing athletic trainers in this regard (National Athletic Trainers' Association, 2015).

The Board of Certification (2012) provided a detailed description of domain 2 (clinical evaluation and diagnosis), stating that athletic trainers must be able to "implemen[t] standard evaluation techniques and formulat[e] a clinical impression for the determination of a course of action" (p. 3). Prentice (2014) expanded on the description of domain 2, stating, "[t]he clinical diagnosis accurately identifies the pathology of injury, the limitations and the possible disabilities associated with a condition" (p. 345). The athletic trainer must be prepared to perform evaluation in a variety of different settings, and according to the Board of Certification (2012), "[t]hrough the use of a sequential evaluation process…the [athletic trainer] provides a clinical diagnosis, appropriate immediate care, and establishes short and long term goals for the affected individual" (p. 3). In the researchers' opinion, the ability of the athletic trainer to clinically evaluate and diagnose injuries is among the most important for practicing athletic trainers. Related literature coincided with researchers' opinion; Eberman and

Finn (2010) reported that 24% of the professional athletic trainers' job consisted of evaluation (p. 170), which was the highest among all other responsibilities. Literature also described the importance of performing a systematic and precise evaluation. (Prentice, 2014; Starkey & Brown, 2015).

The Board of Certification (2012) described domain 3 of the role delineation study (immediate and emergency care), stating that professional athletic trainers must be able to, "emplo[y] standard care procedures and communicat[e] outcomes of efficient and appropriate care of the injured individual" (p. 4). According to the Board of Certification (2012), "[t]he profession of athletic training is unique in that the athletic trainer may be present at the time of an injury or emergency. This requires the clinician be prepared and proficient in all aspects of emergency care" (p. 4). To that end, several position statements have been published by the National Athletic Trainers' Association to assist in the management of the injured athlete (National Athletic Trainers' Association, 2015). Literature related to the immediate and emergency care of the injured athlete has discussed the importance for the athletic trainer to act promptly and proficiently when managing different incidents (Anderson, Courson, & Kleiner, 2002).

The Board of Certification (2012) described domain 4 of the role delineation study (treatment and rehabilitation), stating that professional athletic trainers must be able to, "reconditio[n] participants for optimal performance and function" (p. 5). According to the Board of Certification (2012), "the [athletic trainer] serves as the clinician who designs, administers and executes a plan of care…within this plan of care is the implementation of appropriate techniques, procedures, practices and methods that are designed to provide the patient with optimal outcomes" (p. 4). Prentice expanded upon

the responsibility of the athletic trainer to design and implement a plan of care for the active individual. According to Prentice (2014), "the approach to rehabilitation in an athletic environment is considerably different than in most other rehabilitation settings. The competitive nature of athletics necessitates an aggressive approach to rehabilitation" (p. 442). Several peer-reviewed publications, such as the *Journal of Athletic Training*, are dedicated to the ongoing improvement of treatment and rehabilitative techniques through the pursuit and support of evidence based medicine. Research driven publications such as this serve as a keystone for practicing athletic trainers and athletic training education programs alike.

The Board of Certification (2012) described domain 5 of the role delineation study (organizational and professional health and well-being), stating that professional athletic trainers must be able to, "understan[d] and adher[e] to approved organizational and professional guidelines to ensure individual and organizational well-being" (p. 6). The Board of Certification (2012) continued by stating that through organizational and professional health and well-being, "the [athletic trainer] empowers patients and employees in the improvement of their health-related physical, mental and social well-being as well as physical and professional well-being of the institution and/or organization (p. 5). Prentice (2014) also discussed the importance of organizational standards within the field of athletic training, stating, "[o]perating an effective athletic health care program requires careful organization and administration regardless of whether the setting is a secondary school, college, university, or professional team or a clinical, hospital, or industrial facility" (p. 42). Related literature has been generated by governing bodies such as the Board of Certification (BOC) and the National Athletic

Trainers' Association, which are intended to assist the athletic trainer in the creation and implementation of professional practices related to organizational and professional health and well-being.

Job Settings

A foundational knowledge of potential employment settings for the professional athletic trainer helps the reader to appreciate the rigorous educational preparation received in athletic training education programs. According to the National Athletic Trainers' Association (n.d.b.), professional athletic trainers may find employment in the following settings:

- Public and private secondary schools, colleges and universities, professional and Olympic sports
- Youth leagues, municipal and independently owned youth sports facilities
- Physician offices as physician extenders, similar to nurses, physician assistants, physical therapists and other professional clinical personnel
- Rural and urban hospitals, hospital emergency rooms, urgent and ambulatory care centers
- Clinics with specialties in sports medicine, cardiac rehab, medical fitness, wellness and physical therapy
- Occupational health departments in commercial settings, which include manufacturing, distribution and offices to assist with ergonomics
- Police and fire departments and academies, municipal departments, branches of the military

- Performing arts including professional and collegiate level dance and music. (National Athletic Trainers' Association, n.d.b., para 2)

Recent literature has discussed challenges that have arisen as a result of the variety in professional settings for athletic trainers. According to Sitzler (2016), several professional organizations dedicated to the profession of athletic training are attempting to improve the universal identity of the athletic trainer amongst the public and other health care providers. Sitzler (2016) reported that the National Athletic Trainers' Association (NATA) Terminology Workgroup, which was formally sanctioned by the NATA Board of Directors in 2015, stated, "[w]e challenge every athletic trainer to continue to identify themselves in a way that adds value to the profession, demonstrates our status as a health care provider and enhances our standing in the health care community" (para. 9). In the researcher's opinion, as the profession of athletic training becomes more widely recognized, the variety of employment settings will increase.

Professional Preparation

Although the profession of athletic training may seem new by public opinion, the process of becoming a certified athletic trainer has existed for several years. Athletic trainers began operating independently as early as the 1920's; however, official recognition and standardization of the profession did not come until much later (Prentice, 2014). Grace (1999) published an article documenting the significant milestones of the certification process for athletic trainers. According to Grace (1999), "the first certification examination was administered to 15 candidates in Waco, Texas, in August 1969" (p. 285). The initiation of an official certification process had a significant impact on the profession, and led to changes in the processes and procedures required for

professional certification. The certification process transformed several times over the years, and the process was overseen by several different educational organizations from the 1950's into the 21st century (Grace, 1999). However, in 2007, the Committee on Accreditation of Athletic Training Education (CAATE), which is recognized by the American Medical Association, became the governing body for the athletic training certification process (Prentice, 2014).

CAATE is the organization responsible for creating and updating all regulations and standards for accreditation of athletic training education programs. "[T]he purpose of the Commission on Accreditation of Athletic Training Education is to develop, maintain, and promote appropriate minimum education standards for quality for athletic training programs" (Commission on Accreditation of Athletic Training Education, 2012, p. 1). In order for an athletic training education program to graduate students who are eligible to sit for certification via the national BOC examination, the program must have first been approved by CAATE. This approval process, contingent upon the athletic training education programs' ability to comply with established regulations and standards, allows CAATE to examine athletic training education programs and award accreditation when appropriate (Prentice, 2014). The standards established by CAATE are divided into sponsorship, outcomes, personnel, program delivery, health and safety, financial resources, facilities and instructional resources, operational policies and fair practices, program description and requirements, student records, and distance learning sites (Commission on Accreditation of Athletic Training Education, 2012). It is the responsibility of each athletic training education program to ensure that educational policies and procedures are aligned with CAATE standards. If an athletic training

education program were to fall out of compliance with the policies set forth by CAATE, the program may become subject to a loss of accreditation. In recent years, the BOC, along with educational leaders throughout the profession of athletic training formally submitted a recommendation "that professional education in athletic training should occur at the master's degree level" to the National Athletic Trainers' Association Board of Directors (NATA) (National Athletic Trainers' Association Board of Directors, 2013, p. 3). The National Athletic Trainers' Board of Directors accepted this recommendation, and the CAATE will be responsible for overseeing the transition to a masters' level education program for all athletic training education programs in coming years.

In addition to the standards provided by the CAATE, content areas were also established which designate the information to be instructed throughout the educational curriculum (National Athletic Trainers' Association, n.d.a.). The eight content areas include evidence-based practice, prevention and health promotion, clinical examination and diagnosis, acute care of injury and illness, therapeutic interventions, psychosocial strategies and referral, healthcare administration, and professional development and responsibility (National Athletic Trainers' Association, n.d.a.). In the researcher's experience, these content areas serve as a baseline platform, which are expanded upon through educational mediums and professional styles in order to provide a holistic educational experience and prepare graduates for success in future educational and clinical endeavors. Literature related to specific program design is limited; however, recent research of student perceptions of athletic training education programs has demonstrated a correlation between perceived academic stressors and first-attempt pass rate on BOC examinations (Breitbach et al., 2013). Research has also demonstrated a

correlation between student discernment of self-confidence and the ability to enter the professional workforce (Morin et al., 2014). Athletic training education programs have been afforded a great deal of autonomy regarding the manner in which their students are educated, as long as all components of the educational process remain in alignment with CAATE standards (Potteiger & Lundgren, 2012).

To prepare graduating athletic training students for the challenges of practical application, the clinical education setting was created and implemented by CAATE (Commission on Accreditation of Athletic Training Education, 2012). Rich (2009) noted the importance of a competent clinical setting and the contribution of the clinical setting to the overall learning environment for the athletic training student. Benes et al. (2014) agreed with the previous work of Rich, as they stated:

> [C]linical education experiences continue to be touted as critical in the professional socialization of the athletic training students, mostly because it provides the chance to engage in their future roles…clinical education is an essential learning tool for today's millennial student" (Benes et al., 2014, p. 162).

In the researchers' experience, the clinical education received by athletic training students separates the profession from other allied health care occupations in a positive manner. All athletic training students are required to complete contact hours within the clinical setting under the supervision of a certified athletic trainer (Commission on Accreditation of Athletic Training Education, 2012). The importance of the clinical setting and its contribution to the students' education experience can also been seen in relevant literature, both pertaining specifically to athletic training as well as in reference to other allied health care fields.

Clinical Education Setting

According to the Commission on Accreditation of Athletic Training Education (2012), the clinical education setting focuses on the athletic training student engaging in authentic and applied learning opportunities. Participating in a clinical setting as a part of the educational experience has become standard for several health care professions, and recent research within athletic training education has focused extensively on the clinical education process. Rich (2009) underscored the importance of clinical education as a part of the preparation of athletic trainers as health care professionals. According to Rich (2009), "[a]thletic training education programs (ATEPs) across the United States rely heavily on clinical education to function as a bridge from classroom knowledge to clinical practice and to allow athletic training students (ATSs) to perform psychomotor skills under supervision" (p. 294). Benes et al. (2014) also discussed the importance of clinical experience as it relates to the development of the student. Benes et al. (2014) stated, "although time spent in the classroom is necessary for athletic training students to gain fundamental knowledge, clinical settings are also a critical component in their professional development, mostly because it provides authenticity, an essential step in learning" (p. 157). Researchers agreed that a competent, well-rounded clinical educational experience yields a student more likely to enter the profession successfully (Benes et al., 2014; Rich, 2009).

A significant source of research related to athletic training education is centered on the assessment of clinical integration proficiencies. According to the National Athletic Trainers' Association Education Competencies, "the clinical integration proficiencies (CIPs) represent the synthesis and integration of knowledge, skills, and

clinical decision-making into actual client/patient care" (National Athletic Training Association, 2011, p. 32). Clinical proficiencies, which build upon content initially instructed in the traditional classroom setting, must be practically applied in the clinical setting. While differences of assessment measures exist between athletic training education programs in relation to clinical integration proficiencies, CAATE regulates and oversees all aspects of the clinical integration process. The standards created by CAATE outline measures of assessment regarding clinical integration proficiencies completed by preceptors within the setting (Commission on Accreditation of Athletic Training Education, 2012).

In reference to assessment measures, research has demonstrated the reported effectiveness of certain assessment measures more so than others have. Walker et al. (2008) found that simulations were the most commonly used form of assessment in 201 CAATE approved athletic training programs. These simulations typically consisted of a preceptor presenting a certain clinical scenario, (i.e. an injured ankle), and allowing the student to act as a professional certified athletic trainer in a real time scenario, from initial diagnosis all the way through plan of care (Miller-Issac & Noble, 2014). In similar study, Armstrong, Weidner, and Walker (2009) performed a cross-sectional study on clinical instructors within CAATE accredited programs, and confirmed the earlier findings, which imply that simulations were the most effective method of assessment; however, the use of "real-time situation" was also suggested as an effective alternative. Learning activities, such as simulations, allow the student to develop immediate critical thinking skills, and allow a large number of students the opportunity to engage in critical thinking type scenarios (Miller-Issac & Noble, 2015). Armstrong and Jarriel (2016) expanded on

the utilization of simulations within the clinical setting, by implementing a standardized patient as a part of the learning activity. According to Armstrong and Jarriel (2016), "standardized patients provided a reliable assessment of the athletic training students' clinical performance for obtaining a patient history and completing a physical examination. Devoting additional time during standardized patient training should increase the reliability of clinical performance assessment" (p. 93). Despite the variety which exists between assessments measures across educational programs, current literature demonstrated that the development of reliable assessment measures in the clinical setting fundamentally contributes to the holistic learning experience for the athletic training student (Armstrong & Jarriel, 2016; Armstrong et al., 2009; Miller-Issac & Noble, 2014; Walker et al., 2008).

Another significant amount of research continues to target the diversity of the athletic training clinical experience. In order for athletic training education programs to maintain accreditation, CAATE requires that students undergo clinical experiences in distinct settings (National Athletic Trainers' Association, n.d.a). Traditionally, the clinical environment has not always fostered a conducive and productive learning environment. According to Weidner and Henning (2002), "allied health profession students often felt that they were providing a labor force and being socialized into the profession rather than receiving focused clinical instruction" (p. 224). However, recent research has indicated a shift in the approach to athletic training clinical education in recent years. Dodge, Mazerolle, and Bowman (2015) described the effectiveness of clinical proficiency integration within various clinical settings, and several programs maintain and promote clinical diversity among their respective athletic training students.

Dodge et al. (2015) performed a cross-sectional study on 169 athletic training students and found that clinical settings such as high school and college lacrosse offered more integration opportunities for the students than college football. Rich (2009) also discussed the importance of a diverse and competent clinical setting and its implications on "teachable moments" and proficiency integration. Rich defined teachable moments as it relates to the athletic training education setting as "when a [preceptor] and [athletic training student] actively participate and interact with each other to enhance learning and foster intellectual curiosity in the clinical education environment" (p. 297). Based on this premise, one may draw the conclusion that an increased amount of clinical integration opportunities available to the student correlates to an increased amount of learning opportunities. The concepts of clinical integration and teachable moments presented by Dodge et al. and Rich supported one another, as both signify the unique contributions of the diverse clinical setting to the holistic learning experience of the athletic training student.

Substantial research referenced the interaction between the certified preceptor and the athletic training student, as this interaction is critical in the learning process. Benes et al. (2014) stated, "a positive, meaningful clinical education experience is facilitated by a preceptor supervising the athletic training student" (p. 157). This facilitation often fosters opportunities for students to face real-time critical thinking scenarios, which require them to apply didactically acquired knowledge in a practical, clinical manner. Nakajima and Freesemann (2013) also mentioned the interaction between student and preceptor, as well as the importance on the part of the preceptor, to "detect the type of help-seeking behaviors students use and guide them" (p. 115). The relationship created between

preceptor and student, within the clinical setting, serves as a fundamental part of the educational process for athletic training students, as it allows students to think critically and apply the practical skills required of any certified athletic trainer in a supervised manner.

The intricacies of the preceptor role have been explored through several qualitative and quantitative studies alike, as educational researchers attempt to advance in this area. Mazerolle, Bowman, and Dodge (2014) identified "formal and informal processes" which allow the professional athletic trainer to develop as a preceptor (p. 77). This developmental process of the competent, well-rounded preceptor would become an integral aspect of the successful of the clinical education experience as noted by Nakajima and Freesemann (2013). Mazerolle and Dodge (2015) investigated the specific interactions between the preceptor and athletic training student with the clinical setting in order to gain an understanding of the impact of interactions on the profession. Mazerolle and Dodge (2015) found that "[m]entorship received during these formal educational experiences has been found to be an important retention factor for the student into the workforce as an athletic trainer" (p. 144). Mazerolle, Eason, Nottingham, and Barrett (2016) would agree with previous research in reference to the importance of the preceptor in a mentorship role. In a mixed- method study performed current athletic training students, Mazerolle et al. (2016) found that, "[e]ngaging in a mentoring relationship provided our participants with a chance to advance their clinical competence by using their clinical skills and being challenged to critically think" (p. 79). Mazerolle et al. (2016) would continue by claiming that research presented indicates the fact that professional experience was not a major factor in mentorship effectiveness.

Certification Examination Process

In order for an athletic training student to become nationally certified, he or she must: (1) successfully complete a CAATE accredited athletic training professional program, and (2) successfully pass the BOC examination (Board of Certification, 2015; Prentice, 2014). The BOC serves the athletic training profession as an independent, non-profit organization responsible for establishing the minimum competency level for professional athletic trainers (Board of Certification, 2015; Prentice, 2014). The mission of the BOC is "to provide exceptional credentialing programs for healthcare professionals to assure protection of the public," and all certification exams are deployed through this organization (Board of Certification, 2015, p. 5). At the time of this literature review, the certification examination consisted of 175 content specific questions based on the Role Delineation Study/Practice Analysis, Sixth Edition as defined by the BOC (Prentice, 2014). While CAATE allowed for academic autonomy concerning the specific instruction within athletic training education programs, the content on the BOC examination often times dictated the instructional progression of athletic training related courses. To this end, Potteiger and Lundgren (2012) noted the responsibility of the athletic training instructor in the preparation process for the BOC examination, describing how the first time pass rate for athletic trainers are well below the first time pass rate of other allied health care profession.

Student Learning Styles

A recurrent area of study for athletic training educators are the preferred learning styles of athletic training students. Athletic training programs are traditionally founded on scientific constructs; therefore, many athletic training instructors have limited formal

education in students learning styles (Peer, 2015). Additionally, the emergence of the "millennial generation student" has caused a divide between the educator and the student, as each party attempts to understand and cooperate with the other (Berry, 2010, p. 38). The uniqueness of athletic training curricula makes it difficult to draw correlations between current athletic training educational practices and literature related to learning styles in other areas of higher education. Therefore, it is important to identify student and instructor learning style theories currently present throughout athletic training education literature. To this end, limited research exists on learning styles found among athletic training students.

Draper (1989) pioneered research in regards to learning styles of athletic training students; publishing an analysis of 102 athletic training students who had recently completed the national certification examination. Draper found that "there is little relationship between learning style and performance on the NATA certification examination" (p. 234). Follow up research regarding learning styles of athletic training students would not be performed for nearly a decade (Harrelson & Leaver-Dunn, 1998).

Within current literature, in regards to a theoretical framework, the majority of athletic training education research was based on the theory of experiential learning, which was initially presented by Kolb (Bower, Stemmans, Ingersoll, & Langley, 2001; Schellhase, 2006; Stradley et al., 2002; Thon & Hansen, 2015). While several alternate learning theories exist, Kolb "developed the experiential learning theory as a result to his argument that individuals learn through experience" (Thon & Hansen, 2015, p 160). The experiential learning theory has several correlations to the instructional ideology currently employed by most athletic training education programs, which allows students

the opportunity to learn and acquire information over the course of several semesters (National Athletic Trainers' Association, n.d.a.). Kolb expanded on work of well-known educational theorists Jean Piaget, Kurt Lewen, and John Dewey in the formation of the theory of experiential learning, and the theory is utilized across several educational content platforms today (Kolb, 1984). Kolb (1984) defined learning as "the process whereby knowledge is created through the transformation of experience" (p. 49). He further described the cyclical nature of learning process in four learning modes; concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE) (Schellhase, 2006; Thon & Hansen, 2015). Remaining consistent with the definitions initially established by Kolb, Schmidt (2005) would define the learning modes in the following manner:

1. Concrete experience – learning by experiencing; learning from new experiences; relating to people; being sensitive to feelings and people.
2. Reflective observation – learning by reflecting; carefully observing before making judgments; viewing things from different perspectives; looking inward for the meaning.
3. Abstract conceptualization – learning by thinking; logical analysis of ideas, systematic planning; acting on the basis of one's understanding of a situation.
4. Active experimentation – learning; ability to get things done; risk taking; acting to influence people and events. (pp. 10-11)

Kolb theorized that the pairs of learning modes opposed one another in the creation of learning dimensions (concrete experience - abstract conceptualization; active experimentation - reflective observation) and further explained how an individual may

fall along various aspects of the learning dimension based on personal characteristics (Kolb, 1984). Based on where the individual resides along a dimension of learning, they may be classified as one of four learning styles: divergent, assimilator, converger, and accommodator (Schellhase, 2006; Thon & Hansen, 2015). Remaining consistent with definitions initially established by Kolb, Thon and Hansen (2015) described the learning styles in the following manner:

1. Divergers - combining concrete experience (CE) and reflective observation (RO). These individuals are imaginative, creative, and in touch with their feelings. They excel at viewing situations from many perspectives and generating many ideas in ‘brainstorming’’ sessions.
2. Assimilators combine abstract conceptualization (AC) and reflective observation (RO). Assimilators do well with theories and abstract concepts. These individuals are good at synthesizing various ideas and observations into an integrated whole.
3. Convergers are a combination of abstract conceptualization (AC) and active experimentation (AE). Convergers are very good in the practical application of ideas. They seem to do best when there is a single answer, or when they can focus on specific problems or situations.
4. Accommodators are action people who score highest in concrete experimentation (CE) and active experimentation (AE). They are risk takers and enjoy hands-on activities, making plans, and solving problems by trial and error. Even with their active nature, however, they would rather rely on others for information instead of depending on their own personal analysis (p. 160) (see Figure 1).

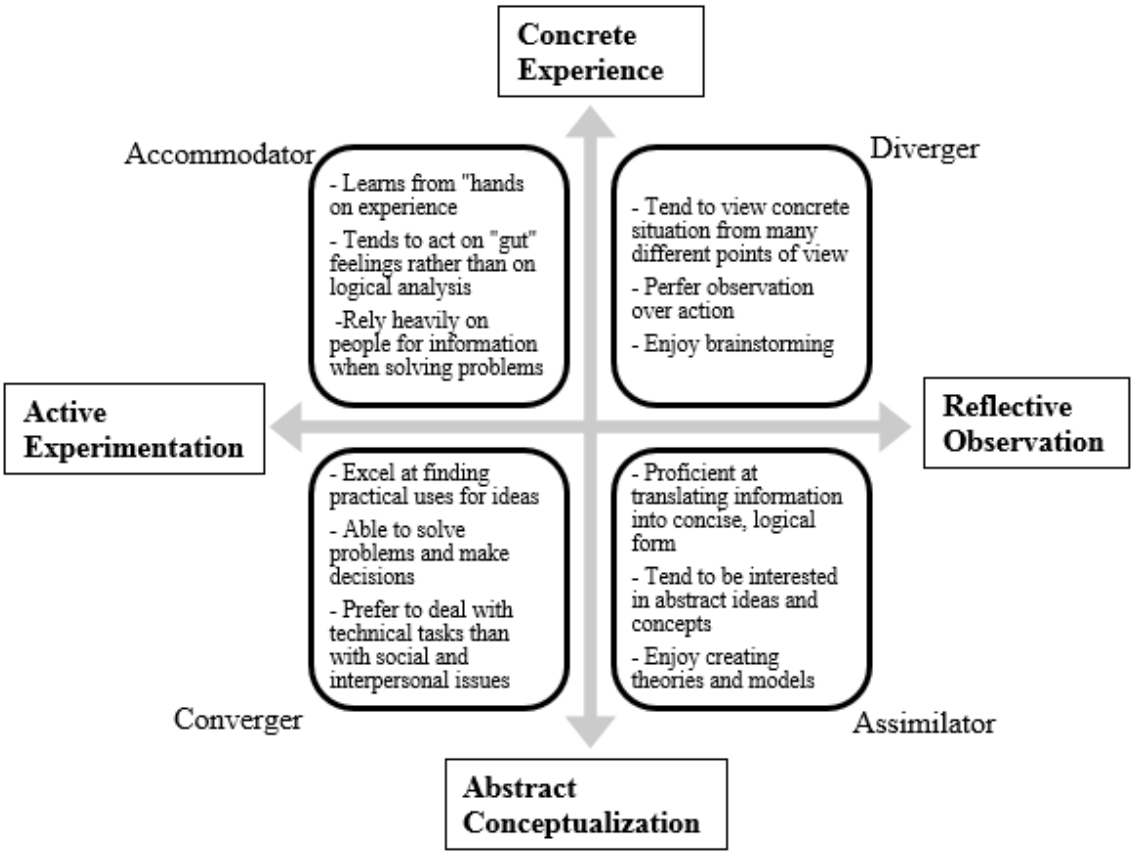

Figure 1. Kolb's model of learning styles. Adapted from Thon and Hansen (2015, p. 162).

In order to assist in the classification of learning styles based on the theory of experiential learning, learning style inventories were created (Taylor, 2001). Several individuals utilized variations of the learning style inventory for the purpose of identifying the occurrence rates and prevalence of Kolb's learning styles in athletic training education (Bower et al., 2001; Schmidt, 2005; Stradley et al., 2002; Taylor, 2001; Thon & Hansen, 2015).

Existing research has indicated that a clear learning style profile may not be prevalent among athletic training education programs. Bower et al. (2001) completed an investigation on Kolb's learning styles with 40 athletic training students by creating a 1 x 4 factorial design study in an attempt to identify which styles dominated among the

students who entered an athletic training program. The research revealed that 37.5% of students identified themselves as assimilators, 27.5% of students identified themselves as convergers, 20% of students identified themselves as divergers, and 15% of students identified themselves as accommodators (p. 133). However, the data produced revealed no significant difference in learning styles among students (Bower et al., 2001). Similar findings were found in the research completed by Taylor (2001) and Stradley et al. (2002). Taylor (2001) utilized Kolb's theory of experiential learning as the basis for an investigation into the learning styles of academically successful and unsuccessful athletic training students. In an analysis of 658 respondents, accommodators and assimilators as appeared to be the most prevalent at 28% each, however, a single learning style could not be identified (p. 64).

Stradley et al. (2002) expanded on the work of Taylor (2001) and Bower et al. (2001) utilizing Kolb's learning theory to regionally identify trends among athletic training students. In a study of 188 athletic training students from different geographic regions, 29.3% self-identified as accommodators, 29.3% self-identified as assimilators, 21.8% self-identified as convergers and 19.7% self-identified as divergers (Stradley et. al., 2002, p. 143). The research completed by Stradley et al. (2002) produced similar results to that completed by Taylor (2001). Accommodators and assimilators were found to be the most prevalent, but no significant evidence existed which signified one learning style as more statistically prevalent in athletic training programs.

Research utilizing alternate learning styles theories to categorize athletic training students has been performed. Gould and Caswell (2006) utilized the theoretical framework originally presented by Gregorc known as Mind Styles and investigated

learning styles of athletic training students and athletic training program directors. The study revealed concrete sequential style emerged most frequently; and several similarities exist between the characteristics of concrete sequential as presented by Gregorc and the accommodator as presented by Kolb (1984).

While a limited amount of literature exists on the learning styles of athletic training students, the researcher believes future studies should be completed to identify specific instructional strategies and learning styles, as well as a possible relationship to successful first time completion of the BOC examination. In the researcher's opinion, as CAATE continues to emphasize BOC examination success as a criterion for athletic training education program accreditation, the need to identify athletic training student learning behaviors will drastically increase.

Instructional Methodology

An abundance of literature related to instructional methodology has been generated over the past century, which includes research focused on several aspects of the educational process. Hattie, a leader in the field of instructional research, published a text intended to quantify effective instructional methodology through the creation of a "best practices" model (Terhart, 2011). Hattie performed a synthesis of over 800 meta-analyses in the creation of a theory for effective instructional methodology (Arnold, 2011). Regarding effective instructional methodology, Hattie (2009) postulated that while commonalities exist among instructional strategies across educational disciplines, certain strategies were more effective than others were. This supposition is well founded amongst practicing educators, as entire journals of study are dedicated to promoting best educational practices, specifically *The Journal of Athletic Training Education.* However,

a concise and culminating effort to synthesize and compare educational practices had not been sufficiently accomplished. Therefore, Hattie (2009) created a continuum of effective practices, ranking each domain in their respective position along a continuum based on their reported effect sizes.

Hattie identified 138 factors of student achievement, separated into six theme derived groups: contributions from the teacher, contributions from the curricula, contributions from teaching approaches, contributions from the students, contributions from the home, and contributions from the school (Terhart, 2011). Regarding the previously mentioned continuum of effective practices, Hattie developed a scale based on reported effect size, utilizing the following equation: Effect size (*d)* = [Mean treatment – Mean control] /Standard Deviation (Hattie, 2009, p. 8). Based on this equation, Hattie categorized the calculated effect size (*d)* in the following manner:

- Effect size *(d)* < 0 - there is a negative contribution of student learning
- Effect size *(d)* < *.2* - the contribution to student achievement is small
- Effect size *(d)* < .4 – the contribution to student achievement is moderate
- Effect size *(d)* < .6 – the contribution to student achievement is strong (Arnold, 2011).

Most factors analyzed resulted in a positive influence on student achievement, therefore, a threshold of (*d)* = .4, was identified as the average effect size across the synthesis of all meta-analyses (Hattie, 2009). Hattie maintained that factors above (*d)* = .4 significantly influenced student achievement in a positive manner (Arnold, 2011; Hattie, 2009; Terhart, 2011). The charts below detail the influential factors identified as significantly contributing to student achievement by Hattie organized by theme.

Rank Order – by theme	
Theme	**Effect Size (*d*)**
Contributions from the teacher	.49
Contributions from the curricula	.45
Contributions from teaching approaches	.42
Contributions from the students	.40
Contributions from the home	.31
Contributions from the school	.23
Average	.40

Theme - Contributions from Teacher: d = .49			
Rank	**Domain**	**Influence**	**Effect Size *(d)***
4	Teacher	Micro Teaching	0.88
8	Teacher	Teacher clarity	0.75
11	Teacher	Teacher-student relationships	0.72
19	Teacher	Professional Development	0.62
21	Teacher	Not labeling students	0.61
56	Teacher	Quality of Teaching	0.44
58	Teacher	Expectations	0.43
Theme - Contributions from Curriculum: d = .45			
Rank	**Domain**	**Influence**	**Effect Size *(d)***
15	Curricula	Vocabulary programs	0.67
16	Curricula	Repeated reading programs	0.67
17	Curricula	Creativity programs	0.65
22	Curricula	Phonics instruction	0.60
27	Curricula	Tactile stimulation programs	0.58
28	Curricula	Comprehension programs	0.58
35	Curricula	Visual-perception programs	0.55
43	Curricula	Outdoor / adventure programs	0.52
46	Curricula	Play programs	0.50
47	Curricula	Second / Third chance programs	0.50
54	Curricula	Mathematics	0.45
57	Curricula	Writing programs	0.44
64	Curricula	Science	0.40
65	Curricula	Social skills programs	0.40
Theme - Contributions from Teaching Approaches d = .42			
Rank	**Domain**	**Influence**	**Effect Size *(d)***
3	Teaching	Providing formative evaluation	0.90
7	Teaching	Comprehensive intervention for learning disabled students	0.77

9	Teaching	Reciprocal teaching	0.74
10	Teaching	Feedback	0.73
12	Teaching	Spaced vs. mass practice	0.71
13	Teaching	Meta-cognitive strategies	0.69
18	Teaching	Self-verbalization / self-questioning	0.64
20	Teaching	Problem solving teaching	0.61
23	Teaching	Teaching strategies	0.60
24	Teaching	Cooperative vs. individualistic learning	0.59
25	Teaching	Study skills	0.59
26	Teaching	Direct instruction	0.59
29	Teaching	Mastery learning	0.58
30	Teaching	Worked examples	0.57
33	Teaching	Concept mapping	0.57
34	Teaching	Goals	0.56
36	Teaching	Peer tutoring	0.55
37	Teaching	Cooperative vs. competitive learning	0.54
40	Teaching	Keller's Personalized System of Instruction	0.53
44	Teaching	Interactive video methods	0.52
53	Teaching	Questioning	0.46
61	Teaching	Behavioral organizers / Adjunct questions	0.41
62	Teaching	Matching style of learning	0.41
63	Teaching	Cooperative learning	0.41
Theme - Contributions from the Student: d = .40			
Rank	**Domain**	**Influence**	**Effect Size *(d)***
1	Student	Self-report grades	1.44
2	Student	Piagetian programs	1.28
14	Student	Prior achievement	0.67
38	Student	Pre-term birth weight	0.54
49	Student	Concentration / persistence / engagement	0.48
51	Student	Motivation	0.48
52	Student	Early intervention	0.47
55	Student	Preschool programs	0.45
60	Student	Self-concept	0.43
66	Student	Reducing anxiety	0.40
Theme - Contributions from the Home: d = .31			
Rank	**Domain**	**Influence**	**Effect Size *(d)***
31	Home	Home environment	0.57
32	Home	Socioeconomic status	0.57
45	Home	Parental involvement	0.51
Theme - Contributions from the School d = .23			

Rank	Domain	Influence	Effect Size *(d)*
5	School	Acceleration	0.88
6	School	Classroom behavior	0.80
39	School	Classroom cohesion	0.53
41	School	Peer influences	0.53
42	School	Classroom management	0.52
48	School	Small group learning	0.49
50	School	School effects	0.48
59	School	School size	0.43

Note. Printed with permission from the author. See Appendix A (Hattie, 2011).

While much of Hattie's analysis focused on research completed in the K-12 educational setting, correlations exist to the higher education setting. Hattie (2009) quantified a model of effective instructional strategies under the premise that the best educational practices remain consistent, regardless of the content being instructed or the student population. With this in mind, the researcher concluded that the findings presented by Hattie might be applied to higher education. It should be noted that several factors identified in the synthesis performed by Hattie are not relevant to the higher education setting, specifically instructional strategies related to the contributions from the student, contributions from the home, and contributions from the school. The researcher only expanded upon data designated influential factors relevant to higher education instructional strategies in this literature review. These factors are to include: micro teaching, teacher characteristics, peer influences, feedback, meta-cognitive strategies, teaching strategies, questioning, cooperative/competitive learning, direct instruction and mastery learning. In addition to the aforementioned, it should also be noted that a great deal of the following literature is intentionally based on research performed in allied health care education. In the researcher's opinion, focusing on educational research

performed in allied health care fields will allow for a greater generalizability to the unique field of athletic training education.

Micro-Teaching

Numerous variations on micro-teaching and group learning can be seen across all levels and disciplines of education. Hattie (2009) discussed the contributions of micro-teaching towards student achievement, defining microteaching as "conducting mini-lessons to a small group of students, and then engaging in post-discussions about the lesson" (p. 112). In the researcher's experience, through the use of small group activities, the instructor is often able to tailor the lesson towards the individual learning styles of the students, and engage students to participate in a more effective manner. Reig and Wilson (2009) made similar claims regarding group-learning exercises as an instructional strategy, listing "discussion groups" among the set of effective core practices for higher education. According to Reig and Wilson, "when using small groups the teacher presents a disciplinary problem requiring critical thinking, students work together to seek a consensus solution to the problem, and the teacher serves as a coach" (p. 285).

Implementation of micro-teaching as an instructional strategy has also been noted within allied health educational disciplines. Remesh (2013) stated, "the conventional methods of medical teacher training are not adequate…[m]icroteaching allows learning each skill to the maximum extent as there is a chance of listening, observing, and practicing" (p. 158). The support for micro-teaching was expanded by Burgess, Ayton, and Mellis (2016), who performed a case study of medical students primarily educated through small group learning. Burgess, Ayton, and Mellis (2016) reported that "students favoured many aspects of the [small group learning] process, particularly motivation to

do the pre-reading, and better engagement in the process" (p. 1). Similar results were recorded by Burgess, Ramsey-Stewart, and Mellis (2012) who used a group learning approach to instruct topographical anatomy to medical students. Burgess et al. (2012) reported that, "[group learning] results in effective acquisition of topographical anatomical knowledge and appears to provide better acquisition of such knowledge than the previous methods of anatomy teaching to which these students had been exposed" (p. 460).

Teacher Characteristics

Hattie (2009) categorized several intrinsic teacher characteristics within his study, and research indicated that each teacher characteristic contributes to the learning processes of the student. However, for the purposes of this study, the researcher drew special attention to teacher clarity of expectations and teacher-student relationships. Regarding the clarity of expectations, utilizing worked examples has also been described as an effective instructional strategy. Although not specifically classified under contributions by the teacher, Hattie (2009) defined worked examples as, "demonstrating to students what 'success' looks like, and thus what the goal could be for their own learning by providing them with worked examples" (p. 172). In the researcher's experience as an instructor within an athletic training education program, providing clear and cohesive directions for classroom activities yields a higher quality outcome than allowing the student to define the parameters of activities/assignments. Therefore, clarity of objectives and a clear description of success criteria are likely to have a high contribution to student achievement.

Hattie (2009) described the ability of the instructor to engage in meaningful relationships with the student, stating; "[b]uilding relations with students implies agency, efficacy, and respect by the teacher for what the [student] brings to the class…and allowing the experiences of the [student] to be realized in the classroom" (p. 118). While the importance of teacher-student relationship is typically indicated in secondary education, recent literature has highlighted a similar level of importance in the higher education setting. Reig and Wilson (2009) noted the effect of the teacher-student relationship within higher education on student achievement; stating, that effective teachers, "have a strong trust in students, and care about student learning" (p. 278). Within athletic training education, a great deal of literature exists which discusses the significance of the teacher-student relationship as an integral aspect of the learning experience. Rich (2009) indicated that the relationship between the teacher (referred to as the preceptor) and the student was crucial, stating that a positive teacher-student relationship drives "teachable moments" within the clinical setting. Bowman, Mazerolle, and Dodge (2013) further investigated the intricacies of the preceptor-student relationship in the clinical setting, and stated, "[w]e agree with previous research that suggests positive relationships between students and preceptors may aid in socializing students into the professional roles and responsibilities of an athletic trainer especially because students identify preceptors as mentors" (p. 38). The commonalities seen throughout higher education literature correlate well with Hattie's assessment of teacher-student relationship as an influential factor on student achievement.

Peer Influences

Whether intentional or inadvertent, peer interactions play a significant role in the educational process. Hattie (2009) discussed several variations of peer oriented instructional strategies and their influence on student achievement. Ranking highest among them was reciprocal teaching, which is afforded its own influence among the top 10 overall contributors towards student achievement. Henning et al. (2010) described the process of reciprocal teaching, explaining how the student changes roles throughout the learning process, transitioning to a teaching role in order to gain new perspective on the content. While several procedures for the implementation of reciprocal teaching exist, Gruenbaum (2012) suggested that activities which promote prediction, questioning, and clarification of the content will positively influence the learning process. Dioso-Henson (2012) researched the effect of reciprocal teaching and non-reciprocal teaching in a higher education physics course, and found that reciprocal teaching led to higher achievement on the summative examination. In addition to the multitude of data driven research available, anecdotal evidence regarding the effectiveness of reciprocal teaching also exists; as most instructors would attest to the fact that the process of teaching requires the individual to comprehend information in a more detailed manner. Hattie (2009) and Henning et al. (2010) agreed that the process of analysis and reflection, created through reciprocal teaching learning activities, leads to higher levels of student achievement.

In addition to reciprocal teaching, Hattie (2009) also identified peer tutoring, and peer feedback as concrete activities, which contributed to student achievement. According to Bates (2014), “peer-assisted learning has been widely implemented throughout K-12 levels of education as well as in the health fields of dentistry, nursing,

occupational therapy, and physical therapy" (p. 114); and a plethora of research exists within the athletic training education. Several recurrent themes relate to the contributions of peer learning activities to student achievement (Bates, 2014; Mackey et al., 2010). Mackey et al. (2010) investigated the perceptions peer assisted learning throughout athletic training education programs, and found athletic training students prefer "informal educational exchanges" as a learning strategy. According to Mackey et al. (2010), "it is apparent that encouraging opportunities for students to engage in peer assisted learning may be a useful educational tool that educators can encourage with students. Athletic training educators…should be aware of the perceived benefits of peer assisted learning" (p. 18). Henning, Weidner, Snyder, and Dudley (2012) also discussed the perceived frequency of peer learning activities throughout athletic training education programs, noting discrepancies in the perception of peer assisted learning amongst athletic training students, athletic training administrators, and clinical instructors. Henning et al. (2012) stated, "[s]tudents seem to have a natural tendency to engage specifically in peer modeling…we encourage the purposeful use of planned peer assisted learning activities in both the laboratory and clinical settings" (p. 219).

As mentioned previously, research has identified specific instructional strategies involving peer influences, which may contribute to student achievement. Liu and Carless (2006) discussed the benefits of peer feedback, stating; "one of the advantages of peer involvement in assessment is that it engages students more actively with the identification of standards and the criteria representing these standards" (p. 287). Research within higher education would also suggest peer assessment as an effective instructional strategy (Henning & Marty, 2008). Several investigations focus on the accuracy and reliability of

peer assessments within athletic training education programs. Research performed by Marty et al. (2010) found that increasing the number of students involved in the peer assessment activity increases the reliability of the assessment. In addition, Englemann (2014) found that students who had advanced further in the educational program were accurate when assessing their fellow students' competency level.

Reig and Wilson (2009) came to a similar conclusion to Hattie (2009), claiming, "peer learning is another strategy found to be effective in the college classroom" (p. 280). In addition, Henning, Weidner, and Jones (2006) argued for the implementation of peer interaction activities in the allied health education curricula, stating; "educators should consider deliberately integrating peer-assisted learning into athletic training education programs to enhance student learning and collaboration" (p. 102). Bates (2014) also promoted the use of peer learning activities, claiming that such activities led to a, "deeper understand contributing to success on the BOC examination" (p. 120). Similar to Bates (2014), Henning and Marty (2008) agreed that peer activities influenced the mental procedures of the learning process; stating, "peer assessment can be implemented to achieve a number of objectives, such as mutual cognitive, meta-cognitive, motivational, attitudinal, and/or social and behavioral" (p. 31).

Feedback

Educational research has indicated that prompt and appropriate feedback on the educational process has strongly influenced the achievement levels of the student (Hattie, 2009). Feedback may be implemented in a variety of different formats, and typically involves either the student providing feedback to the instructor, or the instructor providing feedback to the student. Utilizing feedback exercises has advantages and

shortcomings, depending on the types of feedback exercise implemented. Akkuzu (2014) discussed some of the potential benefits of feedback exercises within the higher education setting, claiming that implementing feedback exercises leads to a direct improvement on student self-efficacy and student performance.

Hattie (2009) classified and evaluated several methods in which feedback can be used as an instructional strategy, including formative evaluations and summative assessment. Formative evaluations were identified in the higher education setting by Reig and Wilson (2009), who listed implementing thoughtful questions, double loop feedback, and reflective responses as essential instructional strategies throughout higher education curricula. Authentic evaluation of feedback, performed by either the instructor or the student, are essential components of the feedback process. Holtgrefe, Perusek, and Lonnernan (2008) described a feedback exercise where the student provides feedback to the instructor regarding the nature and quality of instruction. They proposed that allowing students to give feedback, "increase[s] the quality of learning by providing the instructor an open dialogue with students" (Holtgrefe et al., 2006, p. 11). In a similar feedback exercise, Heinerichs and Curtis (2006) described feedback programs which involve the instructor analyzing the student, claiming that feedback and reflection in this manner "challenges the student to use higher order learning domains" (p. 53).

Several forms of feedback have been documented throughout higher education, and assessment is a term commonly used to describe the nature and manner of such feedback. Reig and Wilson (2009) described the two forms assessment, formative and summative, and continued by stating, "assessment … has a major influence on a student's learning" (p. 282). Holtgrefe et al. (2008) explained the difference between the two

forms of feedback, describing how formative assessments are typically provided throughout the course of instruction, whereas summative assessment occurs at the complete of instruction. According to Holtgrefe et al. (2008), it is important to incorporate both forms of feedback as an instructional tool.

Although not specifically listed under the feedback influence by Hattie, self-assessment is another extremely important aspect of feedback. As mentioned previously, higher education literature discusses how authentic feedback leads to increases in self-efficacy, which directly correlates to self-assessment (Akkuzu, 2014). Hattie (2009) discussed the accuracy and effectiveness of classroom activities involving self-assessment via student self-reporting grades, ranking self-reporting grade activities as the highest influential instructional strategy contributing to student achievement throughout all learning domains.

Meta-cognitive Strategies

Regardless of the format, feedback exercises typically led to a meta-cognitive analysis performed by the student. Heinerichs and Curtis (2006) discussed the implementation of Mandy's Reflective Model within athletic training education curricula, a feedback theory which incorporates feedback and meta-analysis. Research regarding instructional strategies which require the student to activity analyze and assess their personal learning experience, (commonly known as meta-cognitive thinking), have been identified as effective in relation to student achievement (Hattie, 2009). De Backer, Van Keer, and Valcke (2012) defined metacognition as, "the ability to reflect upon, understand, manipulate, and regulate one's cognitive activities during learning" (p. 560). Activities founded around meta-cognitive constructs are commonly referred to as

Piagetian programs. Piagetian programs are founded in the theory of cognitive processes originally presented by Jean Piaget, which described the concept of learning as occurring in stages (Schellhase, 2006; Thon & Hansen, 2015). Multiple cognitive processing theories have been developed and implemented based on the original work performed by Piaget, including the previously mentioned student learning theory of experiential learning (Kolb, 1984). Hattie (2009) also described the importance of understanding the cognitive processes of the student in relation to the content currently being instructed.

Within higher education, literature would suggest a high correlation between the utilization of cognitive/meta-cognitive learning strategies and student achievement across several different disciplines and content areas. De Backer et al. (2012) stated, "meta-cognitive skillfulness corresponds with meaningful, deep-level learning and often results in higher achievement" (p. 560). Their research indicated that meta-cognitive learning interventions (in the form of reciprocal peer tutoring) led to an increase in the cognitive skills and processing ability of the student. Within the allied health care field, Franek and Martin (2008) discussed the prevalence and effectiveness of meta-cognitive instructional strategies within both athletic training and nursing educational programs, specifically referencing the Three Dimensional theory of mastery learning originally presented by Michenbaum and Biemiller.

Teaching Strategies

Hattie (2009) used the term teaching strategies to describe the variety of educational mediums employed by instructors on a day-to-day basis. Through data collection and analysis, Hattie (2009) maintained that all instructional strategies, regardless of their format or delivery, had a positive effect on student achievement.

Examples of specific teaching strategies can be found throughout higher education literature, included athletic training education. Examples of unique instructional strategies seen within athletic training literature are listed below:

- Hawkins, Sharp, and Williams (2015) proposed a variation on traditional instructional strategies, claiming that an implementing "technical and tactical" skills training would improve the athletic training students' ability to think critically and cause the student to be more prepared for entering the workforce.
- Martin, Moran, and Harrison (2009) discussed how introducing debates into the athletic training curricula would allow students to analyze issues from multiple aspects while simultaneously improving the overall learning experience.
- Kaiser (2004) discussed the utilization of reflective journals within athletic training curricula, describing how requiring students to document their experiences through the journaling process causes introspective learning to occur, an aspect often missing in higher education.
- Rehberg, Gazzillo, and Middlemas (2009) researched the effectiveness of traditional classroom education and computer based education, and found that there was no statistical difference in student knowledge on content specific examination. However, it should be noted that there was difference in practical application of skills, with students who received the traditional classroom knowledge scoring higher on practical exams.

Questioning

Current educational literature supported the implementation of instructional strategies involving questioning (Hattie, 2009). Commonly referred to as inductive teaching, subsets of inductive teaching include inquiry-based learning, discovery learning, problem-based learning, project-based learning and hybrid methods, case-based learning, and just-in-time teaching (Prince & Felder, 2007). While unique factors exist amongst each of these strategies, inductive teaching as a whole was characterized by presenting the student with a specific challenge, and requiring students to solve said challenge in their own unique way (Prince & Felder, 2007). Higher education research related to inductive teaching has been performed within several allied health disciplines. Brydges, Nair, Ma, Shanks and Hatala (2012) discussed the utilization of problem based simulations in the instruction of post-graduate medical students, and research collected indicated that "direct self-regulated learning" (a form of problem based learning) was effective in increasing content retention over time. Within athletic training education, Barnum et al. (2009) supported the use of inductive teaching, stating: "asking questions enhances teaching effectiveness and student learning; and is central to effectively facilitating experiential learning and stimulating critical thinking" (p. 23). Ryan, Murray, and Martin (2009) expanded on the description of discovery learning within the athletic training setting, theorizing that, "knowledge discovered by investigation and experience will result in improved retention and be applied and transferred more easily to other situations versus knowledge delivered through a traditional lecture" (p. 32).

Cooperative/Competitive Learning

As a contrast from traditional, individualistic instructional strategies, cooperative and competitive learning refers to the instructional approaches where students work

together in the completion of a previously established goal. According to Hattie (2009), "cooperative learning leads to higher effects than competitive learning, and both are superior to individualistic learning" (p. 213). Reig and Wilson (2009) agreed with Hattie regarding the effect of cooperative learning, listing the instructional strategy among the core practices of higher education. Literature described competitive learning in a variety and formats, and Martin et al. (2009) discussed how one format in particular, debating, could be utilized effectively within the higher education setting. Martin et al. (2009) claimed that using debates, "heighten[s] awareness of issues, reinforce knowledge on a specific topic, sharpen analytical thinking, provide the opportunity to practice listening and speaking skills, and develop tolerance for ambiguity" (p. 32).

Regardless of the procedure utilized when implementing cooperative or competitive learning exercises, goal setting is an important part of the process. Hattie (2009) afforded goal setting its own unique instructional strategy; stating, "achievement is enhanced to the degree that students and teachers set as challenging rather than 'do your best' goals, relative to the students' present competencies" (p. 164). Reig and Wilson (2009) also discussed the importance of setting goals in the higher education setting, describing the process of "taking students out their comfort zones and challeng[ing] them…with high standards" (p. 278). Clarifying the objectives of activities involving cooperative/competitive learning has also been identified as essential, as it provides a barring in which students may follow.

Direct Instruction

Hattie (2009) made a claim for the effectiveness of direct instruction, a teacher-centered approach, as a contributor of student achievement, outlining the seven steps

involved in the proper delivery of the strategy. The steps include: identifying learning intentions, identifying success criteria, building commitment and engagement in the lesson, presenting the lesson, implementing guided practice, closure, and independent practice (Hattie, 2009, p. 204). While most current literature focuses on the benefits of student centered teaching approaches, such as inductive teaching or reciprocal teaching, direct instruction can often times be a more effective means of content delivery, particularly in health care and science fields. Throughout the higher education setting, direct instruction, typically performed in lecture format, is likely the most common medium for instruction. Despite this fact, recent literature is limited regarding the effectiveness of direct instruction in the higher education setting. Reig and Wilson (2009) described the advantages of lecture format, discussing the "pedagogical efficiency" of direct instruction for the instructor. In the researcher's opinion, direct instruction will be utilized in every classroom, regardless of content area or student population.

Mastery Learning

Hattie (2009) described mastery learning and as an instructional strategy which allows the student to "master" the educational content before the instruction progresses. According to Hattie (2009), "mastery learning requires numerous feedback loops, based on small units of well-defined, appropriately sequenced outcomes" (p. 170). Similar to Hattie (2009), Franek and Martin (2008) also posited that mastery learning strategies were a highly effective instructional strategy, highlighting the importance for the student to be able to utilize "self-direction" as a part of their personal learning experience. Mastery learning requires advanced levels of feedback and metacognition, two very

important contributions to achievement previously mentioned. Within higher education, a potential limitation of mastery learning is the sheer volume of content, which must be instructed, particularly within athletic training education.

Concept Mapping/Behavioral Organizers

Hattie (2009) discussed the subtle differences between concept mapping and behavioral organizers, and the contribution made by each instructional strategy to the educational process. According to Hattie (2009), both strategies utilize graphical representations as an organization tool for the content being instructed; however, concept mapping differs by incorporating student involvement in the construction of the tool (Hattie, 2009). Despite the differences, each instructional strategy has been identified as an effective tool within throughout medical education (Daley & Torre, 2010). A literature review performed by Daley and Torre (2010), analyzed the effectiveness of concept mapping within the medical higher education setting. The researchers concluded that concept maps contribute to the educational process: "1. by promoting meaningful learning; 2. by providing an additional resource for learning; 3. by enabling instructors to provide feedback to students; and 4. by conducting assessment of learning and performance" (p. 443). Speicher, Martin, and Zigmont (2013) expanded on the work of Daley and Torre (2010) in their description of the uses for concept mapping, stating, "concept mapping can be utilized for student engagement and as a method to evaluate an individual or group's grasp of a clinical proficiency, complex topic, or problem" (p. 124).

Summary

Athletic training is a multi-faceted health care profession, which involves a rigorous educational process. This educational process includes an in-depth exploration

and understanding of the Role Delineation Study, which is guided by CAATE designated content areas. In order to become a certified athletic trainer, an individual must successfully progress through a CAATE accredited athletic training education program, and receive a score of 500 on the BOC examination. Athletic training education program accreditation is contingent upon compliance with CAATE designated standards, which includes maintaining a first attempt pass rate on the BOC examination of 75%.

Recent literature within higher education allied health fields indicated that evidence based instructional strategies lead to higher student achievement. Therefore, in order to instruct athletic training content in an efficient and effective manner, it is essential to identify which strategies yield the highest result. Evidence-based practice as a concept is not new to the field of athletic training, as athletic training professionals have applied evidence-based medicine in the clinical setting for many years. However, from an educational standpoint, athletic training educators continue to search for the best way to teach the unique content which makes up the athletic training curricula. It is for this reason that ongoing research into effective pedagogical principles within athletic training must take place.

Utilizing Hattie's (2009) conceptual framework of effective instructional strategies and a synthesis of current higher education literature related to effective instructional techniques, the researcher theorizes that the following instructional strategies will contribute to the achievement levels of the athletic training student:

- *Peer influences (reciprocal teaching, peer feedback, peer assessment, cooperative/competitive learning, micro teaching)*
- *Feedback* ⟶ *Meta-cognitive strategies (concept mapping)*

- *Inductive teaching*
- *Teacher-centered instruction*

The effect of the aforementioned instructional strategies will be measured through a mixed method investigation of prevalence and quality characteristics, with a correlational component to first attempt success on the BOC examination. Through an analysis of the effect of research based instructional strategies on athletic training education curricula, the researcher hopes to contribute to the current knowledge of athletic training instructional best practices.

Chapter Three: Methodology

Overview

The researcher selected a mixed methodology approach for this study in order to gather a holistic view of the educational climate within athletic training education programs. According to Fraenkel, Wallen, and Hyun (2015), "[m]ixed-methods research involves the use of both quantitative and qualitative methods in a single study…the use of both methods provides a more complete understanding of research problems than does the use of either approach alone" (p. 555). Qualitative data collected centered on the participant perception of research identified instructional strategies throughout their respective athletic training education programs. Quantitative data collected centered on the participant perception of presence and quality of research identified instructional strategies throughout their respective athletic training education programs. The research process was divided into four parts represented by the graphical presentation in Figure 2.

Framework

Part 1 of the research process consisted of a detailed literature review of research based instructional strategies throughout current allied health education programs. Once research based instructional strategies were identified, the Instructional Strategy Intake Instrument was created, and Part 2 of the research process consisted on launching the survey to the participants of the study.

Part 3 of the research process consisted of qualitative and quantitative data analysis Part 4 was creation of best practice strategies (see Figure 2).

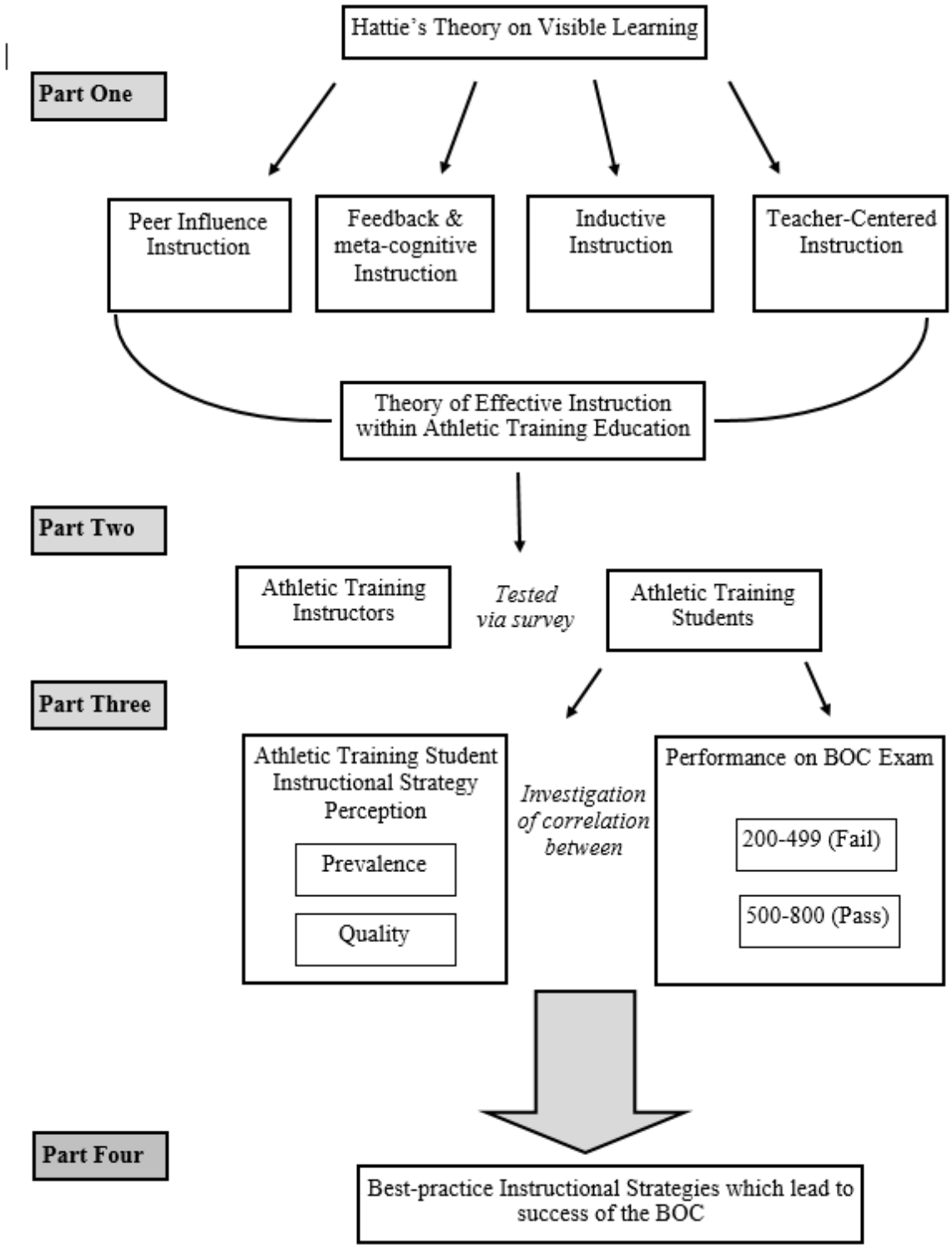

Figure 2. Four step research process. Created as a supplemental explanation for purpose and methodology of the research design.

Research Questions and Hypotheses

Through a comprehensive study of the research literature, four themes emerged as potentially contributing to the academic achievement of athletic training students: peer influence instructional strategies, feedback and meta-cognitive instruction strategies, inductive instruction strategies, and teacher-centered instructional strategies. Once these strategies were identified, the researcher created research questions and hypotheses in order to gain insight into the practices of athletic training education programs. Research questions were created in order to assess participant perception of research based instructional strategies throughout athletic training education programs. Hypotheses were created in order to identify a potential correlation between research based instructional strategies and performance on the Board of Certification (BOC) examination. The research questions and hypotheses are listed as follows:

RQ1: What is the perception of "peer-influence" centered instructional strategies among athletic training students and athletic training instructors?

RQ2: What is the perception of "feedback and meta-cognitive" instructional strategies among athletic training students and athletic training instructors?

RQ3: What is the perception of "inductive" instructional strategies among athletic training students and athletic training instructors?

RQ4: What is the perception of "teacher-centered" instructional strategies among athletic training students and athletic training instructors?

Null Hypothesis 1: There is no relationship between the prevalence of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 2: There is no relationship between the quality of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 3: There is no relationship between the prevalence of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 4: There is no relationship between the quality of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 5: There is no relationship between the prevalence of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 6: There is no relationship between the quality of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 7: There is no relationship between the prevalence of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 8: There is no relationship between the quality of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Null Hypothesis 9: There is no difference between the perception of instructional strategies between athletic training students and athletic training instructors.

Instrumentation

Due to the lack of previous research with regard to instructional strategies within athletic training education programs, an applicable instrument to test the research questions and hypotheses of this study did not exist. Therefore, the Instructional Strategy Intake Instrument (ISII; see Appendix K was created in order to identify the educational climate of athletic training education programs from an instructional strategy standpoint. The Instructional Strategy Intake Instrument is a survey consisting of demographics information questions, Likert-scale prompts, and open-ended questions. Each item of the survey was specifically created and correlated to a corresponding hypothesis and research question, which has been identified in gray highlighted text on the Instructional Strategy Intake Instruments listed below. Once created, the Instructional Strategy Intake Instrument was piloted among experts within the field of athletic training education in order to assess clarity and cohesiveness. Two versions of the Instructional Strategy Intake Instrument were created: the Athletic Training Student Version and the Athletic Training Instructor Version. Differences exist between the versions regarding general demographic information collected and survey questionnaire language; however, the two versions mirror one another from a content standpoint.

Population

The population of the study was determined by the parameters of the hypotheses and research questions. In order for the study to be as generalizable as possible, it was necessary that the researcher include as large of a population as possible. Therefore, all individuals who completed the BOC examination for the first time in the 2015 calendar year were included in the athletic training student population group. In addition, all

individuals who were identified as instructors by the BOC in the 2015 calendar year were included in the athletic training instructor population group. The maximum number of athletic training students who completed the BOC examination for the first time in 2015 calendar year was 2651. The maximum number of certified athletic trainers who were identified as an instructor in 2015 calendar year was 803. Minimum acceptable response rates were listed at 50-100 for athletic training students and 50-100 for athletic training instructors.

Recruitment

All participants were contacted by the BOC through a listserv, with an email inviting them to participate in the study. Parameters for the listserv were created by the researcher, and implemented by a third party. Appendices B-H document the parameters of the listserv, as well as the invoice and correspondence with the BOC. Participation in the study was completely voluntary, and participants of this study received no incentives for participating. No sensitive or identifying information was collected throughout the research process. Two versions of invitation email to participate exist; an athletic training student version and an athletic training instructor version (See Appendices J and I).

Procedures

The step-wise procedures for the research process are documented below. Regarding the quantitative data collected, results from Likert-scales were analyzed in order to investigate the prevalence and quality of instructional strategies among athletic training instructors and athletic training students alike. A potential correlation between athletic training student perception of instructional strategies and performance on the

BOC examination was also investigated. Regarding the qualitative aspect of the research design, each research question (RQ 1-4) was answered through open-ended interview questions. The researcher has indicated how each interview question correlated to the research question on the ISII through grey highlighted text.

1. Review literature in order to identify instructional strategies currently utilized within allied health education and formulate theory of effective instruction within athletic training education (see Figure 2, Part 1).
2. Created Instructional Strategy Intake Instrument (ISII) based on research-based best practices.
3. Piloted Instructional Strategy Intake Instrument (ISII) with experts in the field of athletic training education in order to obtain feedback.
4. Made the appropriate changes based on the feedback in order to increase clarity
5. Sent all potential subjects an email inviting them to participate in the study.
    - Athletic training students and athletic training instructors received the email from a listserv administered by the BOC
6. Conducted analysis of survey questions among athletic training students and athletic training instructors (see Figure 2, Part 3).
7. Conducted analysis of open-ended ISII responses and identified common themes among athletic training students and athletic training instructors (see Figure 2, Part 3).
8. Synthesized data and created best-practice instructional strategies which led to success of BOC examination (see Figure 2, Part 4).

Data Collection/Analysis

Quantitative data was captured through the Qualtrix system and then exported into an SPSS 23.0 (Statistical Package for the Social Sciences) file. The file was data cleaned using a basic frequency analysis looking for missing values. After running a descriptive statistics analysis for demographic data, a series of Chi-Square Tests and Independent Samples *t*-Tests were run for the purpose of answering the nine (9) null hypotheses, with a confidence level of α=.05. The Chi-Square Test of Independence was chosen as a nonparametric test for analyzing the data from the Instructional Strategy Intake Instrument for "Prevalence." The scale for this instrument was deemed to be categorical (nominal/ordinal) in nature with respondents choosing between "never," (0 times) "sometimes" (1-10 times), "often" (11-20 times, and "very often" (>20 times). For the Instructional Strategy Intake Instrument measuring "Quality," a 5-point Likert scale was utilized which allowed a series of Independent *t*-Tests to be calculated in order to compare mean scores for both passing BOC students and failing students and then for a comparison between faculty and student respondents.

Qualitative data were coded into themes using Microsoft Office. Data was exported into a word document, and a latent content analysis was performed as described by Frankel et al. (2015). Once coded, the data was exported to an excel sheet utilizing a Microsoft macro program created by the researcher.

Summary

This mixed-method investigation intended to identify the characteristics of instructional strategies currently utilized throughout athletic training education curricula. In addition, the study also set out to identify a potential correlation between research-

based instructional strategies and success on the BOC examination. The four-step research process was discussed in Figure 1, which included a thorough review of literature, creation of the instrument, deployment of the survey, data collection and analysis, and formation of best-practices instructional strategies which lead to success on the BOC examination.

Research questions and hypotheses were created based on a literature review of best-practices within allied health education. In order to investigate the research questions and hypotheses, the researcher created and piloted the Instructional Strategy Intake Instrument (ISII). Alignment of instrument to the research questions and hypotheses was described, and indicated in gray highlight test (see Appendix K). The procedures involved in participant recruitment and identity protection were detailed, and all statistical tests performed during the quantitative and qualitative analyses were identified. Further analysis and compilation the results, along with formal recommendations of best practices, will be discussed in chapters 4 and 5.

Chapter Four: Results

Introduction

The following section presents the results of the data analysis on prevalence and quality of instructional strategy for faculty and students in the Athletic Training discipline. Data was captured through the Qualtrix system and then exported into an SPSS 23.0 (Statistical Package for the Social Sciences) file. The file was data cleaned using a basic frequency analysis looking for missing values. After running a descriptive statistics analysis for demographic data, a series of Chi-Square Tests and Independent Samples *t*-Tests were run for the purpose of answering the nine (9) null hypotheses, with a confidence level of α=.05. The Chi-Square Test of Independence was chosen as a nonparametric test for analyzing the data from the Instructional Strategy Intake Instrument for "Prevalence." The scale for this instrument was deemed to be categorical (nominal/ordinal) in nature with respondents choosing between "never," (0 times) "sometimes" (1-10 times), "often" (11-20 times, and "very often" (>20 times). For the Instructional Strategy Intake Instrument measuring "Quality," a 5-point Likert scale was utilized which allowed a series of Independent *t*-Tests to be calculated in order to compare mean scores for both passing BOC students and failing students and then for a comparison between faculty and student respondents. The quantitative analysis is presented in sequential format following each null hypothesis.

Quantitative Results

Table 1 shows demographic information for the athletic training instructor respondents. Most respondents identified themselves as instructing in the content areas of therapeutic intervention, clinical examination and diagnosis, and evidence-based

practice. Special attention is drawn to the percentage of instructors who identify themselves as instructing in the psychosocial strategies and referral content area, as this was the lowest representation of all eight content areas.

Table 1

Frequency Analysis for General Instructor Information

Variable	Frequency	Percent
Currently Teaching in an Athletic Training Program		
Yes	69	86.3
No	10	12.5
Athletic Training Academic Program of Instruction		
Undergraduate	52	65.0
Graduate	20	21.3
CAATE Content Areas Primarily Covered		
Evidence-Based Practice	41	51.2
Prevention & Health Promotion	28	35.0
Clinical Examination & Diagnosis	43	53.8
Acute Care of Injury & Illness	39	48.8
Therapeutic Intervention	45	56.3
Psychosocial Strategies & Referral	14	17.5
Healthcare Administration	17	21.3
Professional Development & Responsibility	29	36.3

Table 2 shows demographic information for athletic training student respondents. Special attention is drawn to the first attempt pass rate on the BOC (74%), as it is lower than the national average reported by the Board of Certification of the 2015-2016 academic school year (82.71) (Board of Certification, 2016).

Table 2

Frequency Analysis for General Student Information

Variable	Frequency	Percent
Successful completion of BOC examination for first time in 2015 calendar year		
Yes	91	74.0
No	27	22.0
First attempt score on the BOC examination		
200-299	3	2.4
300-399	6	4.9
400-499	18	14.6
500-599	44	35.8
600-699	39	31.7
700-800	8	6.5
Type of athletic training education program that prepared you to take the BOC examination		
Undergraduate	111	91.9
Graduate	10	8.1

Null Hypothesis 1 states: There is no relationship between the prevalence of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, a crosstab analysis for prevalence of peer influence instruction was performed utilizing a Chi-Square Test of Independence (see Table 3). Based on the data compiled in table 3, Null Hypothesis 1 is not rejected.

Table 3 shows a descriptive report of athletic training student responses to frequency of peer influence instructional strategies.

Table 3

Crosstab Analysis for Prevalence of Peer Influence Instruction

Question	Response	Score Pass		Total
		Yes	No	
Throughout your athletic training courses how often did you take part in the following learning activities:				
Teaching information to classmates.	Never (0 times)			
	Count	2	0	2
	Expected	1.5	0.5	2
	Sometimes (1-10 times)			
	Count	35	12	47
	Expected	36.1	10.9	47
	Often (11-20 times)			
	Count	29	7	36
	Expected	27.6	8.4	36
	Very Often (>20 times)			
	Count	23	8	31
	Expected	23.8	7.2	31
Learning in small groups with instructor.	Never (0 times)			
	Count	7	1	8
	Expected	6.1	1.9	8
	Sometimes (1-10 times)			
	Count	25	9	34
	Expected	26.1	7.9	34
	Often (11-20 times)			
	Count	22	7	29
	Expected	22.3	6.8	29
	Very Often (>20 times)			
	Count	35	10	45
	Expected	34.5	10.5	45
Competitive group activities.	Never (0 times)			
	Count	10	3	13
	Expected	10.0	3.0	13
	Sometimes (1-10 times)			
	Count	49	15	64
	Expected	49.1	14.9	64
	Often (11-20 times)			
	Count	19	5	24
	Expected	18.4	5.6	24
	Very Often (>20 times)			

	Count	11	4	15
	Expected	11.5	3.5	15
Peer Tutoring (receiving & providing).	Never (0 times)			
	Count	29	6	35
	Expected	26.9	8.1	35
	Sometimes (1-10 times)			
	Count	29	14	43
	Expected	33.0	10.0	43
	Often (11-20 times)			
	Count	18	3	21
	Expected	16.1	4.9	21.0
	Very Often (>20 times)			
	Count	13	4	17
	Expected	13.0	4.0	17.0

A Chi-Square Test of Independence comparing the effect of four different peer influence instructional methods on the likelihood of athletic training students passing or failing the BOC examination. No significant relationship was found for any of the four peer influence instructional methods: Teaching information to classmates (χ^2 (3) = .755, p> .05); Learning in small groups with instructor (χ^2 (3) = .178, p> .05); Competitive group activities (χ^2 (3) = .178, p> .05); and Peer tutoring (χ^2 (3) = 3.763, p> .05).

Null Hypothesis 2 states: There is no relationship between the quality of "peer influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, Independent Samples t-Test comparing pass/fail students on quality of peer influence instructional strategies was performed (see Table 5). Based on the data compiled in table 5, Null Hypothesis 2 is not rejected.

Table 4 reports descriptive statistics of athletic training student responses to quality of peer influences instructional strategies. Learning in small groups received the highest rating among the peer influence instructional strategies for students who passed

the BOC examination on the first attempt. Attention is drawn to peer tutoring, and teaching information to classmates, as these strategies were indicated as more helpful to students who failed the BOC on the first attempt.

Table 4

Descriptive Statistics for Quality of "Peer Influence" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Teaching information to classmates			
Passing Students	76	3.86	0.962
Failing Students	23	3.87	0.815
Learning in small groups with your instructors			
Passing Students	76	4.17	0.87
Failing Students	23	4.09	0.733
Competitive group activities			
Passing Students	76	3.53	1.089
Failing Students	23	3.17	0.937
Peer tutoring (receiving/providing tutoring sessions)			
Passing Students	76	3.68	1.036
Failing Students	23	3.78	0.736

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 5 shows a comparison of responses related to quality of peer influence instructional strategies between students who passed the BOC examination on the first attempt and those who failed. None of the four comparisons presented a statistically significant difference in how students evaluated the quality and value of the peer influence instructional methods based upon the criteria of whether they passed or failed the BOC examination. However, a notable (non-significant) difference can be seen in the question on competitive group activities. The mean score for the passing group was 3.53,

which was .36 of a point higher than the mean score for the cohort that failed to pass the BOC test.

Table 5

Independent Samples t-Test Comparing Pass/Fail Students on Quality of "Peer Influence" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Teaching information to classmates	-.065	97	0.949
Learning in small groups with instructors	.420	97	0.675
Competitive group activities	1.402	97	0.164
Peer tutoring (receiving/providing tutoring)	-.424	97	0.673

Null Hypothesis 3 states: There is no relationship between the prevalence of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, a crosstab analysis for prevalence and feedback and meta-cognitive instruction performed utilizing a Chi-Square Test of Independence (see Table 6). Based on the data presented in Table 6, Null Hypothesis 3 is not rejected.

Table 6 shows a descriptive report of athletic training student responses to frequency of feedback oriented instructional strategies. A Chi-Square Test of Independence was calculated comparing the effect of four different feedback and meta-cognitive instruction methods on the likelihood of athletic training students passing or failing the BOC examination.

Table 6

Crosstab Analysis for Prevalence and Feedback Meta-Cognitive Instruction

Question	Response	Score Pass		Total
		Yes	No	
Throughout your athletic training courses how often did you take part in the following learning activities:				
Receiving feedback from instructor on homework and assignments.	Sometimes (1-10 times)			
	Count	12	6	18
	Expected	13.7	4.3	18
	Often (11-20 times)			
	Count	29	9	38
	Expected	29.0	9.0	38.0
	Very Often (>20 times)			
	Count	43	11	54
	Expected	41.2	12.8	54.0
Receiving feedback from classmates on homework and assignments.	Never (0 times)			
	Count	9	3	12
	Expected	9.2	2.8	12.0
	Sometimes (1-10 times)			
	Count	44	11	55
	Expected	42.4	12.6	55.0
	Often (11-20 times)			
	Count	24	6	30
	Expected	23.1	6.9	30.0
	Very Often (>20 times)			
	Count	7	5	12
	Expected	9.2	2.8	12.0
Providing feedback to the instructor on homework and assignments.	Never (0 times)			
	Count	8	4	12
	Expected	9.2	2.8	12.0
	Sometimes (1-10 times)			
	Count	44	13	57
	Expected	43.5	13.5	57.0
	Often (11-20 times)			
	Count	26	6	32
	Expected	24.4	7.6	32.0
	Very Often (>20 times)			
	Count	6	3	9
	Expected	6.9	2.1	9.0

Providing feedback to classmates on homework and assignments.	Never (0 times)			
		Count	11	2	13
		Expected	9.9	3.1	13.0
	Sometimes (1-10 times)				
		Count	48	17	65
		Expected	49.6	15.4	65.0
	Often (11-20 times)				
		Count	21	4	25
		Expected	19.1	5.9	25.0
	Very Often (>20 times)				
		Count	4	3	7
		Expected	5.3	1.7	7.0

No significant relationships were found for any of the four feedback or meta-cognitive instructional methods: Receiving feedback from the instructor on homework/assignments (χ^2 (2) = 1.257, p> .05); Receiving feedback from classmates on homework/assignments (χ^2 (3) = 2.825, p> .05); Providing feedback to the instructor on homework/assignments (χ^2 (3) = 1.539, p> .05); and Providing feedback to classmates on homework/assignments (χ^2 (3) = 2.959, p> .05).

Null Hypothesis 4 states: There is no relationship between the quality of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, Independent Samples t-Test comparing pass/fail students on quality of feedback and meta-cognitive instructional strategies was performed (see Table 8). Based on the data presented above, Null Hypothesis 4 is rejected, specifically in regards to receiving feedback from the instructor on homework and assignments.

Table 7 reports descriptive statistics of athletic training student responses to quality of feedback and meta-cognitive instructional strategies. "Receiving feedback from the instruction on homework/assignments" was rated as the most helpful by students

who passed the BOC examination on the first attempt. Interestingly, students who failed the BOC examination on the first attempt identified "receiving feedback from classmates on homework/assignments," "providing feedback to the instructor on homework/assignments," and "providing feedback to classmates on homework/assignments" as more helpful than students who passed on the first attempt.

Table 7

Descriptive Statistics for Quality of "Feedback and Meta-Cognitive" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Receiving feedback from the instructor on homework/assignments			
Passing Students	76	4.53	0.577
Failing Students	24	4.25	0.676
Receiving feedback from classmates on homework/assignments			
Passing Students	76	3.76	0.709
Failing Students	24	3.92	0.584
Providing feedback to the instructor on homework/assignments			
Passing Students	76	3.43	0.736
Failing Students	24	3.71	0.751
Providing feedback to classmates on homework/assignments			
Passing Students	76	3.55	0.737
Failing Students	24	3.63	0.824

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 8 shows a comparison of responses related to quality of feedback and meta-cognitive instructional strategies between students who passed the BOC examination on the first attempt and those who failed. Only one of the four comparisons presented a statistically significant difference in how students evaluated the quality and value of the

"feedback & meta-cognitive" instructional methods based upon the criteria of whether they passed or failed the BOC examination. The mean score for the passing group for "receiving feedback from the instructor on homework/assignments" was 4.53 compared to 4.25 for the non-passing students. This would suggest that the students who passed the BOC examination viewed the quality of receiving instructor feedback to be significantly higher than those students who failed the examination.

Table 8

Independent Samples t-Test Comparing Pass/Fail Students on Quality of "Feedback & Meta-Cognitive" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Receiving feedback from the instructor	1.962	98	.050*
Receiving feedback from classmates	-0.961	98	0.339
Providing feedback to the instructor	-1.583	98	0.117
Providing feedback to classmates	-0.407	98	0.685

Note. *p<.05.

Null Hypothesis 5 states: There is no relationship between the prevalence of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, a crosstab analysis for prevalence of inductive instruction was performed utilizing a Chi-Square Test of Independence (see Table 9). Based on the data compiled in table 9, Null Hypothesis 5 is not rejected.

Table 9 shows descriptive report of athletic training student responses to frequency of inductive style instructional strategies.

Table 9

Crosstab Analysis for Prevalence of Inductive Instruction

Question	Response	Score Pass		Total
		Yes	No	
Throughout your athletic training courses how often did you take part in the following learning activities:				
Receiving an open-ended question from the instructor	Never (0 times)			
	Count	2	1	3
	Expected	2.3	0.7	3.0
	Sometimes (1-10 times)			
	Count	12	3	15
	Expected	11.5	3.5	15.0
	Often (11-20 times)			
	Count	22	11	33
	Expected	25.2	7.8	33.0
	Very Often (>20 times)			
	Count	45	10	55
	Expected	42	13	55.0
Receiving questions based on case scenarios or patient presentations.	Sometimes (1-10 times)			
	Count	6	4	10
	Expected	7.6	2.4	10.0
	Often (11-20 times)			
	Count	26	4	30
	Expected	22.9	7.1	30.0
	Very Often (>20 times)			
	Count	49	17	66
	Expected	50.4	15.6	66.0
Completing a project/presentation based on a specific set of instructions.	Never (0 times)			
	Count	1	0	1
	Expected	0.8	0.2	1.0
	Sometimes (1-10 times)			
	Count	13	7	20
	Expected	15.3	4.7	20.0
	Often (11-20 times)			
	Count	39	8	47
	Expected	35.9	11.1	47
	Very Often (>20 times)			

	Count	28	10	38
	Expected	29	9	38
Completing a project/presentation with limited instructions or direction.				
Never (0 times)				
	Count	2	1	3
	Expected	2.3	0.7	3
Sometimes (1-10 times)				
	Count	47	11	58
	Expected	44.3	13.7	58.0
Often (11-20 times)				
	Count	17	10	27
	Expected	20.6	6.4	27.0
Very Often (>20 times)				
	Count	15	3	18
	Expected	13.8	4.2	18.0

A Chi-Square Test of Independence was calculated comparing the effect of four different inductive instruction methods on the likelihood of athletic training students passing or failing the BOC examination. No significant relationships were found for any of the four feedback or meta-cognitive instructional methods: Receiving an open-ended question from the instructor (χ^2 (3) = 2.896, p> .05); Receiving questions based on case scenarios or patient presentations (χ^2 (2) = 3.417, p> .05); Completing a project/presentation based on a specific set of instructions (χ^2 (3) = 3.035, p> .05); and Completing a project/presentation with limited instructions or direction (χ^2 (3) = 4.034, p> .05).

Null Hypothesis 6 states: There is no relationship between the quality of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, Independent Samples t-Test comparing pass/fail students on quality of inductive instructional strategies was performed (see Table 11). Based on the data presented in

Table 11, there is enough evidence to reject Null Hypothesis 6, specifically in regards to "receiving questions based on case scenarios or patient presentations." In other words, evidence suggests that students who receive a higher quality of feedback from their instructors have an increased performance on the BOC examination.

Table 10 reports descriptive statistics of athletic training student responses to quality of inductive instructional strategies. "Receiving questions based on case scenarios or patient presentations" was rated as the most helpful by students who passed the BOC examination on the first attempt. Interestingly, students who failed the BOC examination on the first attempt identified "completing a project based on a specific set of instructions as more helpful than students who passed on the first attempt.

Table 10

Descriptive Statistics for Quality of "Inductive" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Receiving open-ended questions from the instructor			
Passing Students	73	4.21	0.726
Failing Students	24	3.96	1.042
Receiving questions based on case scenarios or patient presentations			
Passing Students	73	4.67	0.502
Failing Students	24	4.33	0.761
Completing a project/presentation based on a specific set of instructions			
Passing Students	73	4.04	0.716
Failing Students	24	4.13	0.947
Completing a project/presentation with limited instructions or direction			
Passing Students	73	3.63	1.034
Failing Students	24	3.46	0.932

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 11 shows a comparison of responses related to quality of inductive instructional strategies between students who passed the BOC examination on the first attempt and those who failed. Only one of the four comparisons presented a statistically significant difference in how students evaluated the quality and value of the "inductive" instructional methods based upon the criteria of whether they passed or failed the BOC examination. The mean score for the passing group for "receiving questions based on case scenarios or patient presentations" was 4.67 compared to 4.33 for the non-passing students. This would suggest that the students who passed the BOC examination viewed the quality of receiving questions on case scenarios to be significantly higher than those students who failed the examination.

Table 11

Independent Samples t-Test Comparing Pass/Fail Students on Quality of "Inductive" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Receiving open-ended questions from instructor	1.291	95	0.2
Receiving questions based on cases scenarios	2.496	95	.014*
Completing a project based on specific instructions	-0.458	95	0.648
Completing a project with limited instructions	0.723	95	0.472

Note. *p< .05.

Null Hypothesis 7 states: There is no relationship between the prevalence of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, a crosstab analysis for prevalence of teacher-centered instruction was performed utilizing a Chi-Square Test of Independence (see Table 12). Based on the data compiled in table 12, Null Hypothesis 7 is not rejected.

Table 12 shows a descriptive report of athletic training student responses to frequency of teacher-centered instructional strategies. A Chi-Square Test of Independence was calculated comparing the effect of four different inductive instruction methods on the likelihood of athletic training students passing or failing the BOC examination. No significant relationships was found for three of the four teacher-centered instructional methods: Traditional lectures (χ^2 (3) = 6.193, p> .05); Observing the step-by-step instructions for a task/assignment (χ^2 (3) = .370, p> .05); and Classroom discussion led by the instructor (χ^2 (3) = 1.640, p> .05).

The one Chi-Square Test of Independence that demonstrated a significant relationship was found for homework/out-of-class assignments. A significant interaction was found (χ^2 (2) = 10.780, p< .05). Therefore, evidence suggests that students who were more likely to participate in homework and out of-class assignments seemed to be more likely to do well on the BOC examination.

Table 12

Crosstab Analysis for Prevalence of Teacher-Centered Instruction

Question	Response	Score Pass		Total
		Yes	No	
Throughout your athletic training courses how often did you take part in the following learning activities:				
Traditional lectures.	Never (0 times)			
	Count	1	0	1
	Expected	0.8	0.2	1.0
	Sometimes (1-10 times)			
	Count	3	4	7
	Expected	5.4	1.6	7.0
	Often (11-20 times)			
	Count	14	6	20
	Expected	15.3	4.7	20.0
	Very Often (>20 times)			
	Count	61	14	75
	Expected	57.5	17.5	75.0
Observing the step-by-step instructions for a task/assignment.	Never (0 times)			
	Count	1	0	1
	Expected	0.8	0.2	1.0
	Sometimes (1-10			
	Count	23	7	30
	Expected	23	7	30.0
	Often (11-20 times)			
	Count	24	8	32
	Expected	24.5	7.5	32.0
	Very Often (>20 times)			
	Count	31	9	40
	Expected	30.7	9.3	40.0
Homework/ out of class assignments.	Sometimes (1-10 times)			
	Count	5	7	12
	Expected	9.2	2.8	12.0
	Often (11-20 times)			
	Count	30	4	34
	Expected	26.1	7.9	34.0
	Very Often (>20 times)			
	Count	44	13	57
	Expected	43.7	13.3	57.0

Classroom discussion led by the instructor.	Never (0 times)			
	Count	1	0	1
	Expected	0.8	0.2	1.0
	Sometimes (1-10 times)			
	Count	8	1	9
	Expected	6.9	2.1	9.0
	Often (11-20 times)			
	Count	22	9	31
	Expected	23.8	7.2	31.0
	Very Often (>20 times)			
	Count	48	14	62
	Expected	47.6	14.4	62.0

Null Hypothesis 8 states: There is no relationship between the quality of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination. In order to investigate this hypothesis, Independent Samples t-Test comparing pass/fail students on quality of teacher-centered instructional strategies was performed (see Table 14). Based on the data compiled in table 14, Null Hypothesis 8 is rejected, particularly in regards to the quality of observing step-by-step instructions as a learning strategy.

Table 13 reports descriptive statistics of athletic training student responses to quality of teacher-centered instructional strategies. "Classroom discussion led by the instructor" was reported to be the most helpful throughout in individuals who passed the BOC examination on the first attempt. "Traditional lectures" were reported to be the least helpful of all others groups within the teacher-centered category by all athletic training student respondents.

Table 13

Descriptive Statistics for Quality of 'Teacher-Centered" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Traditional lectures			
Passing Students	82	4.13	0.766
Failing Students	26	3.92	0.156
Observing the step-by-step instructions for a task/assignment			
Passing Students	82	4.34	0.671
Failing Students	26	4.04	0.72
Homework/out-of-class assignments			
Passing Students	82	4.13	0.643
Failing Students	25	3.92	0.702
Classroom discussion led by the instructor			
Passing Students	82	4.37	0.676
Failing Students	26	4.12	0.952

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 14 shows a comparison of responses related to teacher-centered instructional strategies between students who passed the BOC examination on the first attempt and those who failed. Only one of the four comparisons presented a statistically significant difference in how students evaluated the quality and value of the "teacher-centered" instructional methods based upon the criteria of whether they passed or failed the BOC examination. The mean score for the passing group for "observing the step-by-step instructions for a task" was 4.34 compared to 4.04 for the non-passing students. This would suggest that the students who passed the BOC examination viewed the quality of

observing step-by-step instructions to be significantly higher than those students who failed the examination.

Table 14

Independent Samples t-Test Comparing Pass/Fail Students on Quality of "Teacher-Centered" Instructional Strategies

Variable	t	df	Sig. (2-tailed
Traditional lectures	1.213	106	0.228
Observing the step-by-step instructions for a task	1.972	106	.050*
Homework/out-of-class assignments	1.426	106	0.157
Classroom discussion led by the instructor	1.483	106	0.141

Note. *p < .05.

Null Hypothesis 9 states: There is no relationship between the perception of instructional strategies between athletic training students and athletic training instructors. In order to investigate this hypothesis, Independent Samples t-Tests and Chi-Square Tests were performed for peer influence instructional strategies, feedback & meta-cognitive instructional strategies, inductive instructional strategies, and teacher-centered instructional strategies. Based on the data presented in Table 15-26, there is enough evidence to reject Null Hypothesis 9, particularly concerning the differences between athletic training student and athletic training instructor perception of the following:

- Quality of peer tutoring
- Quantity of receiving feedback from the instructor on homework/assignments
- Quantity of receiving feedback from classmates on homework/assignments
- Quantity of receiving an open-ended question from the instructor

- Quantity of completing a project/presentation with limited instructions or direction
- Quality of receiving an open-ended question from the instructor
- Quality of homework/out of class assignment

Table 15 shows a descriptive report of athletic training student and athletic training instructor responses to frequency of peer oriented instructional strategies. A Chi-Square Test of Independence was calculated comparing four different peer influence instruction methods based upon membership in either a student or faculty evaluation group. No significant relationships or differences were found for any of the four peer influence instructional methods: Teaching information to classmates (χ^2 (3) = .165, p> .05); Learning in small groups with instructor (χ^2 (3) = 4.988, p> .05); Competitive group activities (χ^2 (3) = 3.776, p> .05); and Peer tutoring (χ^2 (3) = 7.069, p> .05).

Table 15

Crosstab Analysis for Prevalence of Peer Influence Instruction Comparing Instructors to Athletic Training Students

Question	Response	Group		Total
		Student	Faculty	
Throughout your athletic training courses how often did you take part (did students take part) in the following learning activities:				
Teaching information to classmates.	Never (0 times)			
	Count	2	1	3
	Expected	2.0	1.0	3.0
	Sometimes (1-10 times)			
	Count	48	23	71
	Expected	47.2	23.8	71.0
	Often (11-20 times)			
	Count	40	22	62
	Expected	41.2	20.8	62
	Very Often (>20 times)			
	Count	31	15	46
	Expected	30.6	15.4	46.0
Learning in small groups with instructor.	Never (0 times)			
	Count	9	0	9
	Expected	6.0	3.0	9.0
	Sometimes (1-10 times)			
	Count	34	19	53
	Expected	35.2	17.8	53.0
	Often (11-20 times)			
	Count	32	19	51
	Expected	33.9	17.1	51.0
	Very Often (>20 times)			
	Count	46	23	69
	Expected	45.9	23.1	69.0
Competitive group activities.	Never (0 times)			
	Count	13	10	23
	Expected	15.3	7.7	23.0
	Sometimes (1-10 times)			
	Count	67	32	99
	Expected	65.8	33.2	99.0
	Often (11-20 times)			
	Count	26	16	42

	Expected	27.9	14.1	42.0
Very Often (>20 times)				
	Count	15	3	18
	Expected	12	6	18.0
Peer Tutoring (receiving & providing).				
Never (0 times)				
	Count	35	35	42
	Expected	28.2	13.8	42.0
Sometimes (1-10 times)				
	Count	44	30	74
	Expected	49.7	24.3	74.0
Often (11-20 times)				
	Count	24	13	37
	Expected	24.9	12.1	37.0
Very Often (>20 times)				
	Count	18	9	27
	Expected	18.2	8.9	27.0

Table 16 reports descriptive statistics of responses related to peer influence instructional strategies from athletic training students and athletic training instructors. For all variables assessed within the peer influence instructional strategy category, athletic training instructors rated the quality of instruction more positively than athletic training students.

Table 16

Descriptive Statistics for Quality of "Peer Influence" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Teaching information to classmates			
Students	101	3.86	0.917
Faculty	59	4.05	0.729
Learning in small groups with your instructors			
Students	101	4.16	0.833
Faculty	59	4.31	0.565
Competitive group activities			
Students	101	3.46	1.054
Faculty	59	3.54	0.75
Peer tutoring (receiving/providing tutoring sessions)			
Students	101	3.72	0.971
Faculty	59	4	0.719

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 17 shows a comparison of the reported quality between athletic training students and athletic training instructors. Only one of the four comparisons presented a statistically significant difference in how students and faculty evaluated the quality and value of the peer influence instructional methods. Peer tutoring was rated more favorably at 4.00 by faculty members compared to a 3.72 for student response.

Table 17

Independent Samples t-Test Comparing Students and Faculty Response on Quality of "Peer Influence" Instructional Strategies

Variable	t	df	Sig. (2-tailed
Teaching information to classmates	-1.356	158	0.177
Learning in small groups with instructors	-1.2	158	0.232
Competitive group activities	-0.556	158	0.579
Peer tutoring (receiving/providing tutoring)	-1.908	158	.505*

Note. *p< .05.

Table 18 shows a descriptive report of responses related to the prevalence of feedback and meta-cognitive activities among athletic training students and athletic training instructors. A Chi-Square Test of Independence was calculated comparing the effect of four different feedback and meta-cognitive instruction methods for students versus faculty perception on how helpful they might be for preparing to take the BOC examination. Two non-significant relationships were found for "providing feedback to the instructor on homework/assignments" (χ^2 (3) = 4.476, p> .05); and "providing feedback to classmates on homework/assignments" (χ^2 (3) = 7.137, p> .05).

The two significant Chi-Square tests were discovered for the feedback and meta-cognitive instructional strategies of "receiving feedback from the instructor on homework/assignments" (χ^2 (2) = 20.545, p< .05) and "receiving feedback from classmates on homework/assignments" (χ^2 (3) = 9.381, p< .05). Interestingly, the faculty surveyed over-estimated the prevalence of which they gave feedback to students compared to how students evaluated the prevalence of this instructional strategy.

Table 18

Crosstab Analysis for Prevalence of "Feedback & Meta-Cognitive" Instruction Comparing Instructors to Athletic Training Students

Question	Response	Group		Total
		Student	Faculty	
Throughout your athletic training courses how often did you take part (did students take part) in the following learning activities:				
Receiving feedback from instructor on homework and assignments.	Sometimes (1-10 times)			
	Count	19	1	20
	Expected	13.3	6.7	20.0
	Often (11-20 times)			
	Count	39	8	47
	Expected	31.3	15.7	47.0
	Very Often (>20 times)			
	Count	56	48	104
	Expected	69.3	34.7	104.0
Receiving feedback from classmates on homework and assignments.	Never (0 times)			
	Count	12	2	14
	Expected	9.3	4.7	14.0
	Sometimes (1-10 times)			
	Count	56	42	98
	Expected	65.1	32.9	98.0
	Often (11-20 times)			
	Count	32	9	41
	Expected	27.3	13.7	41.0
	Very Often (>20 times)			
	Count	13	4	17
	Expected	11.3	5.7	17.0
Providing feedback to the instructor on homework and assignments.	Never (0 times)			
	Count	12	1	13
	Expected	8.7	4.3	13.0
	Sometimes (1-10 times)			
	Count	30	30	90
	Expected	60.4	29.6	90.0
	Often (11-20 times)			
	Count	32	20	52

	Expected	34.9	17.1	52.0
	Very Often (>20 times)			
	Count	10	5	15
	Expected	10.1	4.9	15.0
Providing feedback to classmates on homework and assignments.	Never (0 times)			
	Count	13	3	16
	Expected	10.7	5.3	16.0
	Sometimes (1-10 times)			
	Count	67	45	112
	Expected	74.7	37.3	112.0
	Often (11-20 times)			
	Count	26	6	32
	Expected	21.3	10.7	32.0
	Very Often (>20 times)			
	Count	8	3	11
	Expected	7.3	3.7	11.0

For the instructional strategy of "receiving feedback from classmates on homework/assignments" the students surveyed seemed to believe this happened with much greater prevalence than faculty members. This could likely mean that the students gave this type of feedback informally to one another outside of the class setting and the faculty members did not perceive this as part of their instructional process.

Table 19 shows a descriptive report of the quality of feedback and meta-cognitive instructional strategies for athletic training students and athletic training instructors. "Receiving feedback from classmates on homework/assignment" was reported as the most helpful strategy within the feedback and meta-cognitive instructional strategy category by both athletic training students and athletic training instructors.

Table 19

Descriptive Statistics for Quality of "Feedback & Meta-Cognitive" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Receiving feedback from the instructor on homework/assignments			
Students	102	4.46	0.608
Faculty	57	4.54	0.569
Receiving feedback from classmates on homework/assignments			
Students	102	3.81	0.685
Faculty	56	3.80	0.644
Providing feedback to the instructor on homework/assignments			
Students	102	3.53	0.754
Faculty	57	3.63	0.858
Providing feedback to classmates on homework/assignments			
Students	102	3.59	0.762
Faculty	56	3.66	0.695

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 20 shows a comparison of responses related to the quality of feedback and meta-cognitive instructional strategies between athletic training students and athletic training instructors. None of the four comparisons presented a statistically significant difference in how students and faculty evaluated the quality and value of the feedback and meta-cognitive instructional methods. However, it is notable that "receiving feedback from the instructor on homework and assignments" was scored almost a point higher for both faculty (4.54) and students (4.46) compared to the scores for the remaining three types of feedback strategy.

Table 20

Independent Samples t-Test Comparing Students and Faculty Response on Quality of "Feedback & Meta-Cognitive" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Receiving feedback from the instructor	-0.845	157	0.399
Receiving feedback from classmates	0.091	156	0.928
Providing feedback to the instructor	-0.854	157	0.394
Providing feedback to classmates	-0.589	156	0.556

Table 21 shows descriptive statistics of responses related to the frequency of inductive oriented instructional strategies for both athletic training students and athletic training instructors. A Chi-Square Test of Independence was calculated comparing the four different inductive instruction methods based upon faculty and student perceptions. Two significant relationships were found for the four inductive instructional methods: "Receiving an open-ended question from the instructor" (χ^2 (3) = 7.830, p< .05) and "completing a project/presentation with limited instructions or direction" (χ^2 (3) = 8.358, p< .05). For the first inductive instruction method, instructors seemed to be perceive that they used this strategy to greater effect than the students believed it to be occurring in the classroom setting. The students also appeared to perceive that there were a greater number of assignments or projects given with limited instructions and/or direction when compared to faculty respondents.

The two- non-significant chi-square tests were determined for "receiving questions based on case scenarios or patient presentations" (χ^2 (2) = 2.315, p> .05) and "completing a project/presentation based on a specific set of instructions" (χ^2 (3) = 3.937, p> .05).

Table 21

Crosstab Analysis for Prevalence of Inductive Instruction Comparing Instructors to Athletic Training Students

Question	Responses	Group		Total
		Student	Faculty	
Throughout your athletic training courses how often did you take part (did students take part) in the following learning activities:				
Receiving an open-ended question from the instructor.	Never (0 times)			
	Count	3	0	3
	Expected	2	1	3
	Sometimes (1-10 times)			
	Count	16	4	20
	Expected	13.3	6.7	20.0
	Often (11-20 times)			
	Count	34	11	45
	Expected	29.8	15.2	45.0
	Very Often (>20 times)			
	Count	57	41	98
	Expected	64.9	33.1	98.0
Receiving questions based on case scenarios or patient presentations.	Sometimes (1-10 times)			
	Count	10	2	12
	Expected	8	4	12.0
	Often (11-20 times)			
	Count	32	14	46
	Expected	30.5	15.5	46.0
	Very Often (>20 times)			
	Count	68	40	108
	Expected	71.6	36.4	108.0
Completing a project/presentation based on a specific set of instructions.	Never (0 times)			
	Count	1	0	1
	Expected	0.7	0.3	1.0
	Sometimes (1-10 times)			
	Count	21	15	36
	Expected	23.9	12.1	36.0
	Often (11-20 times)			
	Count	49	17	66
	Expected	43.7	22.3	66.0

	Very Often (>20 times)			
	Count	39	24	63
	Expected	41.7	21.3	63.0
Completing a project/presentation with limited instructions or direction.	Never (0 times)			
	Count	3	7	10
	Expected	6.6	3.4	10.0
	Sometimes (1-10 times)			
	Count	61	32	93
	Expected	61.6	31.4	93.0
	Often (11-20 times)			
	Count	28	13	41
	Expected	27.2	13.8	41.0
	Very Often (>20 times)			
	Count	18	4	22
	Expected	14.6	7.4	22.0

Table 22 shows a descriptive report of athletic training student and athletic training instructor responses to the quality of inductive oriented instructional strategies. Both athletic training students and athletic training instructors rated “receiving questions based on cases scenarios or patient presentations” as the most helpful variable with the category. In addition, athletic training instructors rated all four inductive instructional methods related to inductive instruction higher than athletic training students with regards to the overall quality of instruction. Completing a project with limited instructions and/or direction was rated the least helpful at 3.59 and 3.60 respectively for students and faculty.

Table 22

Descriptive Statistics for Quality of "Inductive" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Receiving an open-ended question from the instructor			
Students	100	4.15	0.809
Faculty	55	4.44	0.688
Receiving questions based on case scenarios or patient presentations			
Students	100	4.58	0.589
Faculty	55	4.71	0.458
Completing a project/presentation based on a specific set of instructions			
Students	100	4.07	0.769
Faculty	55	4.27	0.525
Completing a project/presentation with limited instructions or direction			
Students	100	3.59	1.006
Faculty	55	3.6	0.872

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 23 shows a comparison of athletic training student and athletic training instructor responses to the quality of inductive instructional strategies. Only one of the four comparisons presented a statistically significant difference in how students and faculty evaluated the quality and value of the inductive instructional methods. The faculty respondents (mean of 4.44) perceived a greater value in the use of open-ended questions compared to the students (mean of 4.15). However, it should be noted that scores of over 4.00 rank between "helpful" and "extremely helpful" on the 5-point Likert scale.

Table 23

Independent Samples t-Test Comparing Students and Faculty Response on Quality of "Inductive" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Receiving open-ended questions from the instructor	-2.221	153	.028*
Receiving questions based on scenarios/presentation	-1.407	153	0.161
Completing project based on specific instructions	-1.743	153	0.083
Completing project with limited instructions	-0.062	153	0.951

Note. *p< .05

Table 24 shows a descriptive report of responses to the frequency of teacher-centered instructional strategies from athletic training students and athletic training instructors. A Chi-Square Test of Independence was calculated comparing the effect of four different teacher-centered instruction methods comparing student and faculty perceptions. No significant relationships were found for any of the four teacher-centered instructional methods: Traditional lectures (χ^2 (3) = .567, p> .05); Observing the step-by-step instructions for a task/assignment (χ^2 (3) = 1.558, p> .05); Homework/out-of-class assignment (χ^2 (2) = .300, p>.05); and Classroom discussion led by the instructor (χ^2 (3) = 2.137, p> .05).

Table 24

Crosstab Analysis for Prevalence of Teacher-Centered Instruction Comparing Instructors to Athletic Training Students

Question	Response	Group		Total
		Student	Faculty	
Throughout your athletic training courses how often did you take part (did students take part) in the following learning activities:				
Traditional lectures.	Never (0 times)			
	Count	1	0	1
	Expected	0.7	0.3	1.0
	Sometimes (1-10 times)			
	Count	7	3	10
	Expected	6.7	3.3	10.0
	Often (11-20 times)			
	Count	20	10	30
	Expected	20.0	10.0	30.0
	Very Often (>20 times)			
	Count	78	40	118
	Expected	78.7	39.3	118.0
Observing the step-by-step instructions for a task/assignment.	Never (0 times)			
	Count	1	0	1
	Expected	0.7	0.3	1.0
	Sometimes (1-10 times)			
	Count	30	12	42
	Expected	28	14	42.0
	Often (11-20 times)			
	Count	32	15	47
	Expected	31.3	15.7	47.0
	Very Often (>20 times)			
	Count	43	26	69
	Expected	46.0	23.0	69.0
Homework/ out of class assignments.	Sometimes (1-10 times)			
	Count	13	5	18
	Expected	12.0	6.0	18.0
	Often (11-20 times)			
	Count	34	17	51
	Expected	34.0	17.0	51.0
	Very Often (>20 times)			

	Count	59	31	90
	Expected	60.0	30.0	90.0
Classroom discussion led by the instructor.				
	Never (0 times)			
	Count	1	0	1
	Expected	0.7	0.3	1
	Sometimes (1-10 times)			.0
	Count	9	4	13
	Expected	8.7	4.3	13.0
	Often (11-20 times)			
	Count	31	21	52
	Expected	34.7	17.3	52.0
	Very Often (>20 times)			
	Count	65	28	93
	Expected	62.0	31.0	93.0

Table 25 shows descriptive statistics of responses to the quality of teacher-centered instructional strategies for athletic training students and athletic training instructors. Athletic training instructors rated “homework/out of class assignments” and “classroom discussion led by the instructor” more favorably that athletic training students.

Table 25

Descriptive Statistics for Quality of "Teacher-Centered" Instructional Strategies: "How helpful were the following strategies in preparing you for the BOC examination"

Variable	N	Mean	Standard Deviation
Traditional lectures			
Students	112	4.08	0.773
Faculty	53	4.08	0.703
Observing the step-by-step instructions for a task/assignment			
Students	112	4.28	0.687
Faculty	53	4.28	0.69
Homework/out-of-class assignments			
Students	111	4.07	0.684
Faculty	53	4.28	0.533
Classroom discussion led by the instructor			
Students	112	4.29	0.755
Faculty	53	4.43	0.572

Note. The mean scores in the above table are based on a 5-point Likert scale including: 1=extremely unhelpful, 2=unhelpful, 3=no opinion, 4=helpful, and 5=extremely helpful.

Table 26 shows a comparison athletic training student and athletic training instructor responses to the quality of teacher-centered instructional strategies. Only one of the four comparisons presented a statistically significant difference in how students and faculty evaluated the quality and value of the teacher-centered instructional methods. The faculty respondents (mean of 4.28) perceived a greater value in the use of homework/out-of-class assignments compared to the students (mean of 4.07). However, it should be noted that scores of over 4.00 rank between "helpful" and "extremely helpful" on the 5-point Likert scale. Student and faculty scores for each of the four inductive instructional methods were all scored higher than a 4.00 on a 5-point Likert

scale suggesting that of all the different categories of instructional methods, the teacher-centered methods were viewed to be of greatest value to both students and faculty.

Table 26

Independent Samples t-Test Comparing Students and Faculty Response on Quality of "Teacher-Centered" Instructional Strategies

Variable	t	df	Sig. (2-tailed)
Traditional lectures	0.039	163	0.969
Observing step-by-step instructions for tasks	-0.054	163	0.957
Homework/out-of-class assignments	-1.977	162	.050*
Classroom discussion led by the instructor	-1.191	163	0.236

Note. *p< .05.

Qualitative Results

Qualitative data was coded into themes using Microsoft Office. Data was exported into a word document, and a latent content analysis was performed as described by Frankel et al. (2015). Once coded, the data was exported to an Excel spreadsheet utilizing a Microsoft macro program created by the researcher. From the Excel chart, the researcher was able to identify the themes listed below:

Communication

A recurrent theme throughout both athletic training student and athletic training instructor responses was the impact of various instructional strategies on communication throughout the learning experience. Communication would take form in several different manners, and was therefore further divided into sub-themes: *peer mentorship, peer interactions, and inter-professional relations*.

Peer Mentorship

Athletic training students (ATS) commented on the value of interacting with other students, and its contribution to the overall learning experience. Athletic training students stated, '[i]n the clinical setting I feel that peer learning is more valuable as you

are able to observe older students who are more comfortable and understand more skills' (ATS 92). Similar findings were found among athletic training instructors (ATI), who stated, '[w]e have seen extreme benefits with upperclassmen teaching the underclassmen in the program. It allows them to become a preceptor, re-establish their skills/knowledge, and improve their confidence' (ATI 2).

Peer Interactions

Athletic training students and athletic training instructors commented on the significant contributions of peer-interactions to the overall learning experience. Athletic training instructors stated, '[p]eer-to-peer discussions have helped them to create dialogue between their counterparts which creates comfortable conversation amongst each other. Also, having the students receive and give feedback to the instructors bridges the gap of learning' (ATI 2). In addition, athletic training students stated that peer interactions, '[h]elped to learn how to work with different personalities' (ATS 78).

Athletic training students described the structure of peer interaction throughout their educational program, stating, '[i]n our clinical internships we were often paired with another older student, or with a younger one program-wise. We learned from [each other] and the older ones were charged with helping prepare the younger ones' (ATS 102). This design for peer interaction was typical of the overall structure reported by several athletic training instructors and athletic training students. In general, peer interactions had positive outcomes, as athletic training students reported that peer interactions lead to, '[w]orking as a team and understanding you role within the group/organization and how that plays out during employment as an AT' (ATS 111). Athletic training students also stated that, 'student to student [feedback] would open up

more ideas and reasons for situations or circumstances' (ATS 83). Respondents suggested that several learning opportunities led to an increase in peer interactions. This was especially seen in respondents who identified themselves as having a small program.

Inter-Professional Relations

Athletic training students described the value of instructional strategies and their contribution to the development of inter-professional relations. An athletic training student stated, 'peer learning exercises I have learned helped me the most when I am working with another sports medicine team. With peer learning everyone has their opinion and idea but you work together to find the one that works the best for everyone' (ATS 95).

Improvement to Instruction

A recurrent theme throughout both athletic training student and athletic training instructor responses was a sense of overall improvement to instructional practices seen with the use of various instructional strategies. Improvement to instruction would be further broken down into the following sub-themes: *improved teaching techniques, improvement to class/program structure, and learning outcomes.* Learning outcomes would be also be separated into r*etention and application, new ideas, and introspection/critical thinking*.

Improved Teaching Techniques

Several instructional strategies led to improvements to the teaching techniques employed throughout the curricula. Athletic training students reported positive and beneficial experiences with feedback activities throughout their respective educational experience. The typical feedback experience in the clinical atmosphere was described by

athletic training students who stated, ‘we would receive feedback from our instructor during our athletic training proficiency check offs. We would perform a skill and the teacher would tell us what we did right or wrong and give us tips on how to improve those skills’ (ATS 21). Athletic training students also described, ‘feedback activities in which the student was asked to answer a series of questions or scenarios, which would be assessed by a peer or instructor’ (ATS 74). In addition, athletic training students described frequent feedback on clinical evaluations, mock practical examinations, soap notes, oral presentations, and daily classroom assignments. Athletic training students stated that when involved in feedback activities, ‘[t]eacher- student experiences were extremely helpful because it allowed us to be explained an answer we may have not learned or seen. Student- student activities also allowed us to discuss concepts others had seen or learned, and all understand together’ (ATS 9). Athletic training instructors responded in a similar manner, stating, ‘[f]eedback activities provide opportunities for intellectual thought and critical thinking. It fosters cooperative learning’ (ATI 57).

Athletic training students preferred feedback interactions, which were ‘encouraging and realistic,’ and stated, ‘[s]ome of the criticism from my peers after presentations or group activities were beneficial for my ability to improve on things but not 100%’ (ATS 72). In addition, athletic training students stated, ‘interactions that prompted discussion were best and I learned the most from’ (ATS 73). Athletic training instructors provided similar responses regard the nature of feedback within the learning environment, stating, ‘[f]eedback should be positive, constructive and informative. It should also provide detail when necessary’ (ATS 52). The general athletic training student response to feedback activities was, ‘that feedback activities were essential in the

success as a student, understanding why something was done or the approach that should be taken and why was helpful with clarifying difficult concepts' (ATS 107).

However, athletic training students reported that certain characteristics of feedback did not contribute to their learning experience, stating that feedback which was 'not taken seriously' was not as 'satisfying.' In addition, athletic training students also stated that, 'feedback from professors took a long time in most cases so that hindered the quality of the feedback' (ATS 72).

Regarding inductive instruction, athletic training students and athletic training instructions reported that several methods helped to improve the instruction of the course. According to athletic training instructors, '[t]eaching through questioning is essential. Allowing the students to answer questions independently is very helpful for them' (ATI 6). Questioning activities during lecture, presentations, debates, research assignments, mock evaluations, and proficiencies examinations were all mentioned as useful to the overall learning experience. Athletic training students stated, '[t]owards the end of my final year of undergrad, we had sessions of asking different/harder questions and I feel like those questions helped' (ATS 84).

Regarding teacher-centered instructions, athletic training instructors commented on the importance of lecturing, stating, '[t]he role of lecturing is to provide a basis of understanding and then we use teaching facilitation to enhance learning and problem solving skills' (ATI 59). Athletic training students reported that although not the most preferable method, lecturing was likely the most necessary in the overall learning experience. Students stated that, '[l]ectures were almost always more boring than the hands on activities. They were very necessary because if you do not understand the basic

ideas of an exercise, special test, skill etc. than you will not be able to perform them' (ATS 21). Respondents also believed that teacher-centered instructional strategies were most effective if there was some sort of follow up activity to the learning experience. Athletic training students stated, 'lectures are more beneficial when there is discussion afterward and propel can ask questions and clarify things they didn't understand' (ATS 56). Athletic training instructors provided a similar response, stating, '[l]ecture should provide an opportunity for students to ask questions about the content to clarify understanding as well as discuss how they may be/have been able to apply some didactic content in clinical practice' (ATI 9). Several athletic training students described difficulties associated with lectures, particularly in regards to student engagement, and suggested interactive approaches to lectures. Respondents stated, '[s]ome lectures were very educating and interesting, however some lectures were very boring and hard to pay attention in' (ATS 71).

Improvement to Class/Program Structure

Several instructional strategies led to an overall improvement to class or program structure. Athletic training students described typical feedback opportunities in relations to program design, stating, 'we had to complete feedback forms and discuss it with our program director. Also, for each class we had to fill out a form on that professor stating what we thought they did well and what we thought they could improve' (ATS 60). In addition, athletic training students reporting feedback activities which involved being, 'evaluated clinically by our preceptors, once mid- way through the rotation and again at the end. These discussions and numerical feedback made it easier to step up where it was needed and see what we were doing well with' (ATS 96).

Athletic training students commented how the use of inductive instruction strategies led to improvements in the athletic training education program overall. Athletic training students stated, '[s]enior year was basically full of classes revolving around this idea of open questions. It made each individual think and try to understand the topic deeper rather than just having the directions fed to you and being led to the answer' (ATS 96). Athletic training instructors reported a similar experience with inductive instruction strategies, stating, '[t]eaching through questioning is essential. Allowing the students to answer questions independently is very helpful for them' (ATI 6).

Learning Outcomes

Athletic training students and athletic training instructors described several instructional strategies that led to improvements to overall learning outcomes, which were manifested in several different ways. Learning outcomes would further divided into the following sub-groups: *retention and application*, *new ideas,* and *introspection/critical thinking.*

Retention and application

A common notable learning outcome for all educational programs is the retention and application of information, and several instructional strategies were noted by athletic training students and athletic training instructors to contribute to this end. Peer interaction instructional strategies reportedly assisted the athletic training student in this regard, as students stated, 'I benefited from being able to pick my fellow students' brains on labs that I did not fully understand and maybe they did…I also was able to help others understand things that I had a better understanding of than them' (ATS 65). Athletic

training students also commented on the frequency and effectiveness of inductive instructional strategies, and stated that in many cases, inductive instruction led to a greater understanding of the current topic at hand. Athletic training students stated that, 'we were encouraged to ask questions, appropriately and when patients were not present. this was helpful in understanding the purpose and reasoning for an exercise' (ATS 53). In addition, with regard to inductive instruction, students stated, 'if questions were asked following the information and scenarios were given it may have been easier to comprehend and understand' (ATS 73).

New Ideas

Regarding learning outcomes, several instructional strategies discussed led to the formation of new ideas and new ways of thinking. Instructional strategies that involved peer interaction as a component of the learning experience resulted in a self-reported exposure to new ideas as well as introduction to new ways of thinking. Students reported, 'listening to peers give a lecture or presentation gave me an opportunity to learn in a way that might be different from how the instructor would do it' (ATS 62). In addition, students also reported that 'my peers really helped me find solutions to these problems and find creative ways to be efficient and still be doing tests and procedures correctly' (ATS 69). Inductive instructional strategies were reported to '[help] us think outside of the box and for different solutions to problems we might encounter' (ATS 58). Students also stated that, 'ethical and clinical philosophy questions really attempt to stimulate people's differences in how they might handle a particular problem' (AS 82).

Introspection/Critical Thinking

Another learning outcome which was influenced by various instructional strategies was the ability of the athletic training student the critically analyze information. Peer interaction also caused the student to undergo an introspective process, where many students were able to critically analyze their learning process. This introspective critical analysis process was facilitated by a myriad of learning activities, and respondents reported several benefits of peer interactions in general. Athletic training instructors discussed the importance of critical thinking activities, stating, '[s]tudents must learn to be thinkers, not just follow directions from preceptors' (ATI 60). Athletic training students stated 'case studies are extremely helpful in the peer learning aspect because they are intended to go into deep detail and thoroughly explain a specific topic' (ATS 84). In addition, students stated, 'grading class mates each other was a good way to find out what we often mistake' (ATS 61).

Athletic training students also reported on the positive impact of feedback activities on the introspective, critical analysis process, stating that feedback, 'helped point hidden mistakes that was not conscientious of doing. This was helpful on improving my performance and maintaining open communication. I learned how to give constructive criticisms as well' (ATS 78). Athletic training instructors reported similar indications for the usage of feedback activities, stating, 'feedback activities are designed to promote critical thinking and clinical decision making' (ATI 64).

The impact of inductive instruction strategies on critical thinking was also noted by athletic training students, as they stated, '[m]y professors used this often and I feel it help me to critically think for myself and work through different scenarios in regards to

treatments and evaluations' (ATS 94). In addition, students stated that inductive instruction strategies 'were extremely helpful because they taught me to think critically rather than just relying on the cookie cutter situations that are listed in the textbook' (ATS 21). Athletic training instructors also reported similar findings regarding the use of inductive instruction strategies, stating, 'scenario-based/case-based activities have been increasing in our program over the last two years. I believe that these type of activities involves critical thinking, and highlights a student's areas of weakness' (ATI 54).

Student Engagement

Athletic training instructors described the ability of various instructional strategies to increase student engagement. Athletic training instructors stated, '[e]ach different feedback activity type…has unique role in student engagement and the learning process' (ATI 58). Both athletic training instructors and athletic training students discussed the importance of student engagement in the learning process.

Reciprocal Teaching

Several athletic training students commented on the value of reciprocal teaching as an integral aspect of the learning experience, describing how interacting with their peers in this manner often lead to an increase in understanding. One student described that when teaching to classmates, 'I make sure I study what I am presenting proficiently due to the fact it helps your confidence when you know it and to answer questions' (ATS 83). Athletic training instructors also described the importance of reciprocal teaching activities, stating, '[t]eaching to others truly forces you to understand the material. This is a beneficial activity to have to think about a topic so deeply that you understand it fully' (ATI 53).

Real World Application

Athletic training instructors discussed the importance of a practical application component to the learning experience, stating, '[a]thletic training is problem solving. Presenting a problem and developing a solution is imperative for critical thinking development' (ATI 70). In addition, athletic training instructors detail several opportunities to incorporate 'real-life scenarios' into various content areas and lesson plans.

Athletic training students described how several instructional strategies helped prepare them for their professional career as a certified healthcare professional. When asked about their experiences with inductive instructions, students described how questioning 'put us on the spot to react in the proper way that we would have to in real-life situations. It was greatly beneficial for the BOC and practicals' (ATS 9). Inductive strategies were also an integral aspect of the clinical experience, as several students reported being questioned on case studies, and being required to apply classroom information in a practical manner. Students reported, '[k]nowing how to find the answers you're looking for was taught to us and it really helps now being a full time ATC' (ATS 97). Feedback activities were also mentioned as a mechanism to prepare athletic training students for further educational endeavors.

Suitable Design

Both athletic training instructors and athletic training students discussed how the content of a course guided the effect of instructional strategies utilized. A common theme that emerged for athletic training students and athletic training instructors was the use of a mixed-method approach, which involved teacher-centered instruction initially,

followed by interactive peer-oriented learning activities and frequent feedback exercises. In addition, both athletic training students and athletic training instructors favored a 'hands on' approach to learning, which creates frequent opportunities for real world application. In addition, both athletic training instructors and athletic training students provided several examples of useful and un-useful learning activities throughout the athletic training curricula, and a great deal of overlap existed between the two groups. In general, learning activities that allowed for student engagement, frequent feedback, inductive instruction, and teacher-centered instruction were perceived as useful, while un-structured learning activities with limited teacher-student interaction or student engagement were perceived as un-useful to the overall learning experience.

Summary

Data collected provided a holistic view of the educational climate within athletic training education programs. The experimental design allowed for correlational hypotheses investigating a potential relationship between quality/quantity and first attempt success on the BOC examination. According to the data, a potential correlation exists between first attempt success on the BOC examination and the quality of:

1. Receiving feedback from the instructor (feedback and meta-cognitive instruction),
2. Receiving questions based on case scenarios or patient presentations (inductive instruction)
3. Observing the step-by-step instructions for a task (teacher center instruction)

In addition, a possible correlation exists between the first attempt success of the BOC examination and the quantity of "homework/ out of class assignments."

The research also set out to identify discrepancies in the perception of instructional strategies between athletic training students and athletic training instructors. The data indicated the following discrepancies:

- Peer tutoring was rated more favorably by athletic training instructors than athletic training students.
- Receiving feedback from the instructor on homework/assignments was perceived to occur more frequently by athletic training instructors than by athletic training students
- Receiving feedback from classmates on homework/assignments was perceived to occur more frequently by athletic training instructors than by athletic training students
- Receiving an open-ended question from the instructor was perceived to occur more frequently by athletic training instructors than by athletic training students
- Completing a project/presentation with limited instructions or direction was perceived to occur more frequently by athletic training students than by athletic training instructors
- The faculty respondents (mean of 4.44) perceived a greater value in the use of open-ended questions compared to the students (mean of 4.15).
- Receiving an open-ended question was perceived as more helpful by athletic training instructors than athletic training students

Qualitative data collected supported the evidence presented by the quantitative data, specifically concerning the reported effectiveness of feedback and meta-cognitive instruction and inductive instruction. In addition, qualitative responses between the two participant pools confirmed the rejection of Null Hypothesis 9, which indicated that no relationship existed between athletic training instructor and athletic training student perception of research based instructional strategies. Qualitative data collected also indicated that certain instructional strategies were more useful than others depending on the content being instructed. Both athletic training instructors and athletic training students described the use of a holistic approach to athletic training education, which includes a combination of several instructional strategies. The data collected lays the foundation for a model for best-practices for athletic training educators, which will be discussed in chapter 5.

Chapter Five: Discussion and Reflection

Review of Methodology

The purpose of this study was to examine research-based instructional strategies throughout CAATE accredited athletic training education programs from the perception of the athletic training student and the athletic training instructor. The study also investigated a potential correlation between student identified instructional strategies and first-attempt success rate on the athletic training Board of Certification (BOC) examination. The research process was broken down into four parts (displayed in Figure 2). The quantity and quality of the research-identified instructional strategies were assessed through a series of Chi-Square Tests and Independent Samples *t*-Tests. Qualitative data was combed for themes utilizing a latent content analysis approach.

Data Analysis

Research Questions

Research Question 1: What is the perception of "peer-influence" centered instructional strategies among athletic training students and athletic training instructors?

Athletic training students and athletic training instructors had a positive perception of peer oriented instructional strategies throughout their respective curricula. Several respondents commented on the 'collaborative learning environment' which was reinforced in the clinical setting; and how often times, small class size increased the amount of peer interaction. Quantitative data described "learning in small groups with your instructors" as the highest rated variable within the peer influence classification, with an average quality score of 4.16 for athletic training students, and 4.31 for athletic

training instructors. This average score correlates to "extremely helpful" on the Instructional Strategy Intake Instrument (ISII), and it is significant that both students and faculty viewed this as the highest rated peer influence instructional strategy within the category. The ability of peer oriented instructional strategies to increase communication, and therefore increase the learning experiences was also discussed. Additionally, when implemented properly, peer oriented instructional strategies cause critical thinking and introspection to occur, which led to increased performance on both clinical and didactic exams. Respondents also discussed improper uses of peer oriented instruction, and agreed that if peer-oriented instruction was not structured properly, it was difficult for learning to occur. Therefore, based on the data presented, the use of peer-influenced instructional strategies directly contributed to the meta-cognitive processes of the athletic training student, which were identified in relevant literate as a contributing factor to student achievement.

Research Question 2: What is the perception of "feedback and meta-cognitive" instructional strategies among athletic training students and athletic training instructors?

Athletic training students and athletic training instructors viewed feedback activities as helpful, particularly if the feedback was from teacher to the student. Quantitative data supported this conclusion, as "receiving feedback from the instruction on homework/assignments" has the highest rated quality among athletic training students and athletic training instructors at 4.46 and 4.54 respectively. This average score correlates to "extremely helpful" on the Instructional Strategy Intake Instrument (ISII), and it is significant that both students and faculty viewed this variable as the highest rated

feedback and meta-cognitive instructional strategy within the category. Respondents suggested that immediate feedback was more useful than delayed feedback, and that the feedback needed to be constructive in nature. While both athletic training students and athletic training instructors found value in peer-to-peer feedback exercises, the feedback offered was typically generic, and rarely helpful. Therefore, the data produced by this study mirrors the characteristics produced in relevant literature, specifically concerning the practice of providing specific guidelines for improvement, and the potential contribution to student achievement. In general, athletic training students did not find value in student to teacher feedback, likely because they could not see the results of their feedback immediately.

Research Question 3: What is the perception of "inductive" instructional strategies among athletic training students and athletic training instructors?

Athletic training students and athletic training instructors found great value in the use of open-ended questions, particularly in regards to specific clinical cases. Respondents reported that inductive instruction prompted critical thinking, and often times forced them to think outside the box and find creative solutions. Qualitative data produced suggested that inductive instructional strategies were particularly useful in the clinical setting, which coincides relevant literature related to the use of simulations and clinical scenarios. Quantitative data affirmed the qualitative data, as "receiving questions based on case scenarios or patient presentations" were the highest rated variable within the inductive strategies for both athletic training student and athletic training instructors, with an average score of 4.58 and 4.71 respectively. This average score correlates to "extremely helpful" on the Instructional Strategy Intake Instrument (ISII), and it is

significant that both students and faculty viewed this variable as the highest rated inductive strategy within the category. Athletic training instructors also noted the ability of inductive instructional strategies to increase student engagement and apply classroom content to real world scenarios.

Research Question 4: What is the perception of "teacher-centered" instructional strategies among athletic training students and athletic training instructors?

Athletic training students and athletic training instructors found teacher-centered instructional strategies to be necessary, albeit often non-engaging. Respondents noted that when formatted properly, lectures were an excellent teaching technique, particularly when learning new information. This correlates well with the common practices of higher education, discussed in the literature review. "Classroom discussion led by the instructor" was the highest rated variable within teacher-centered strategies by athletic training student and athletic training instructors, with and average score of 4.29 and 4.43 respectively. This average score correlates to "extremely helpful" on the Instructional Strategy Intake Instrument (ISII), and it is significant that both students and faculty viewed this variable as the highest rated teacher-centered strategy within the category. Both athletic training students and athletic training instructors suggested that follow-up activities needed to occur for the learning process to be effective.

Hypotheses

Null Hypothesis 1: There is no relationship between the prevalence of "peer-influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is not enough evidence to reject Null Hypothesis 1. Therefore, evidence suggests that there is no correlation between the quantity of peer-influence instructional strategies and first attempt success on the BOC examination.

Null Hypothesis 2: There is no relationship between the quality of "peer influence" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is not enough evidence to reject Null Hypothesis 2. Therefore, evidence suggests that there is no correlation between the quality of peer-influence instructional strategies and first attempt success on the BOC examination.

Null Hypothesis 3: There is no relationship between the prevalence of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is not enough evidence to reject Null Hypothesis 3. Therefore, evidence suggests that there is no correlation between the quantity of feedback and meta-cognitive instructional strategies and first attempt success on the BOC examination.

Null Hypothesis 4: There is no relationship between the quality of "feedback and meta-cognitive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is enough evidence to reject Null Hypothesis 4, specifically in regards to "receiving feedback from the instructor on homework and

assignments." Therefore, evidence suggests that students who receive high quality feedback from their instructors throughout their professional preparation have a higher likelihood to pass the BOC examination on the first attempt.

Null Hypothesis 5: There is no relationship between the prevalence of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is not enough evidence to reject Null Hypothesis 5. Therefore, evidence suggests that there is no correlation between the quantity of inductive instructional strategies and first attempt success on the BOC examination.

Null Hypothesis 6: There is no relationship between the quality of "inductive" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data collected, there is enough evidence to reject Null Hypothesis 6, specifically in regards to "receiving questions based on case scenarios or patient presentations." Therefore, evidence suggests that students who receive high quality questions based on scenarios or patient presentations from their instructors throughout their professional preparation have a higher likelihood to pass the BOC examination on the first attempt.

Null Hypothesis 7: There is no relationship between the prevalence of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on of the data collected, there is enough evidence to reject Null Hypothesis 7, specifically concerning participating in homework and out of class assignments. Therefore, evidence suggests that the more often that student participate in teacher-centered instruction, namely homework and out of class assignments, the more likely that will pass the BOC examination on the first attempt.

Null Hypothesis 8: There is no relationship between the quality of "teacher-centered" instructional strategies noted by athletic training students and performance on the Board of Certification examination.

Based on the data, there is enough evidence to reject Null Hypothesis 8, particularly in regards to the quality of observing step-by-step instructions as a learning strategy. Therefore, evidence suggests that students who receive a higher quality teacher-centered instructional experience are more likely to pass the BOC on the first attempt.

Null Hypothesis 9: There is no relationship between the perception of instructional strategies between athletic training students and athletic training instructors.

Based on the data collected above, there is enough evidence to reject Null Hypothesis 9, particularly concerning differences between athletic training student and athletic training instructor perception of the following:

- Quality of peer tutoring
- Quantity of receiving feedback from the instructor on homework/assignments
- Quantity of receiving feedback from classmates on homework/assignments
- Quality of receiving an open-ended question from the instructor
- Quality of completing a project/presentation with limited instructions or direction

- Quality of receiving an open-ended question from the instructor
- Quality of homework/out of class assignment.

Therefore, evidence suggests that athletic training students and athletic training instructors have different perceptions on the quantity and quality of researched-based instructional strategies.

Discussion: Best-Practices for Athletic Training Educators

The data produced by this study provides invaluable insights into the overall climate of athletic training education programs. The researcher was able to gain understanding of the perceptions of research-based instructional strategies, and confirm that best practices are being utilized in various capacities across the nation. The ever-changing climate of higher educational will continually challenge athletic training instructors to improve upon their craft, and teach in the most effective manner possible. Therefore, usage and implementation of the research-based instructional strategies is vital to continual success of all athletic training education programs.

Based on the nature of the responses, today's athletic training student is cognizant of their learning progression, and frequently desires avenues to engage in the content being instructed. The ability to self-appraise is likely a characteristic of the millennial student; therefore, athletic training educators must not only be aware of this occurrence, but also must create opportunities for the athletic training student to develop cognitively throughout their learning experience. Athletic training instructors and athletic training students both identified the following strategies as the most helpful within their respective instructional strategy category:

- Learning in small groups with your instructors

- Receiving feedback from the instruction on homework/assignments
- Receiving questions based on case scenarios or patient presentations
- Classroom discussion led by the instructor.

However, data collected suggested that there is a significant disconnect between athletic training students and athletic training instructors regarding the perceptions of learning experiences. This discrepancy must be addressed by athletic training instructors, as they attempt to connect with students in meaningful and productive way.

One of the overarching priorities for athletic training educators is optimize student performance on the BOC examination. Preparing students to successfully complete the examination on the first attempt often times dictates the progression and practices of an athletic training education program. Therefore, it is vitally important that athletic training educators are equipped with the tools to teach in the most effective manner possible. To this end, data produced by this study suggests that high quality feedback, inductive instruction, and teacher centered instruction leads to first attempt success on the BOC examination. Furthermore, implementing a higher number of teacher-centered instructional assignments also leads to first attempt success on the BOC examination.

Based on both qualitative and quantitative data gathered, the researcher suggests that effective instruction utilizes a combination of research-based instructional strategies, and allows the content to drive the manner of instruction. Typically, formal instruction of new content begins in the classroom with traditional lecture style instruction, however, in order for said lecture to be effective, there must be some sort of follow-up instructional strategy, which increases student engagement and allows for feedback and transformative thinking opportunities on the part of the student. In addition, the athletic training

instructor must constantly look for ways to increase communication and collaboration between the students, while implementing inductive instructional strategies through the course. In order for this complex process to be successful, the athletic training instructor must spend a great deal of time planning and directly initiating learning activities for the athletic training student. When time is invested into the instructional plan by the instructor, the outcomes can be exponentially positive for the student.

Recommendations for Future Study

While a mixed-method approach was the appropriate for study, there are inevitable drawbacks and to limitations to the design. In the future, completing interviews with athletic training students and athletic training instructors would provide a more in-depth view of their perceptions of the usefulness of various instructional strategies. In addition, future research investigating the effectiveness of blended instructional strategies in specific athletic training content areas may benefit the current level of understanding for the topic. For example, investigating the effects of inductive instruction within modality course would provide valuable information about the effectiveness of the research-based instructional strategy for that content specifically. In addition, performing a longitudinal study of the effect of blended instructional strategies over the course of a semester or clinical rotation would potentially further validate the findings of this study.

Conclusion

Athletic training instructors have a unique challenge with regard to their professional responsibilities. They must prepare students for a lifetime of success as a proficient healthcare provider, while simultaneously preparing them for success on a

didactic comprehensive examination. While overlap exists between the two responsibilities, athletic training instructors often struggle to find the best way to convey their knowledge in a way that prepares the athletic training student for success the BOC examination. This study investigated the best way to prepare athletic training students to pass the BOC examination on the first attempt. With the findings presented by this study, athletic training educators are better equipped to interact with their students in an effective manner, and prepare them for their future endeavors.

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Appendices

Appendix A: Permission to Use Research

Cox, Aedryan N.

From: Roberts, Bruce <Bruce.Roberts@tandf.co.uk>
Sent: Monday, November 02, 2015 2:36 AM
To: John Hattie; Cox, Aedryan N.
Subject: RE: Permission to Use Research

Aedryan,
That's no problem. We ask only that you credit and cite John's original work correctly.
Good luck
Bruce

From: John Hattie [mailto:jhattie@unimelb.edu.au]
Sent: 31 October 2015 05:25
To: Cox, Aedryan N.
Cc: Roberts, Bruce
Subject: RE: Permission to Use Research

Thanks for this Aedryan

Officially you need to contact the publishers – and have referred you to Bruce who will guide this request through the system

Best wishes for the thesis

John

John Hattie
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Associate Director of the ARC-SRI: Science of Learning Research Centre: http://www.slrc.org.au
Honorary Professor at University of Auckland
Honorary Professor at University of Durham

SCIENCE OF LEARNING RESEARCH CENTRE

New papers: Politics of Distraction & Politics of Collaborative Impact -- pearson.com/hattie

Visible Learning into Action = https://www.routledge.com/products/9781138853751
Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to...

1

Appendix B: BOC Email Order Form

BOC BOARD OF CERTIFICATION
FOR THE ATHLETIC TRAINER

Email Blast/Mailing List Order Form
Fax all pages to (402) 561-0598

Contact Information:

BOC Provider #: 2000009834
Email: acox@lindenwood.edu
Phone #: 573-881-4902
Fax #: 636-627-2550
(Please include area code)

Billing Information:

Company Name: Lindenwood University
Contact Name: Aedryan Cox
Address: 1052 Arlington Drive
St. Charles, MO. 63303
(Please include city, state, postal code and country)

Shipping Information (if different):

Company Name:
Contact Name:
Address:
(Please include city, state, postal code and country)

List Options:

Email Blast sent by BOC on Your Behalf — *Provide content at least:*

1. Client supplies HTML and plain text version of email — 3 business days prior to scheduled date
2. Client supplies content and images and BOC creates email using a template — 3 business days prior to scheduled date
3. Client supplies content and images and BOC creates a custom email design — 5 business days prior to scheduled date

Sender email address: acox@lindenwood.edu

Subject Line: Athletic Training Education Survey

Mailing Addresses

1. List sent via email to a mailing house — Email Address: acox@lindenwood.edu
2. Pre-printed labels mailed to purchaser

One-Time Use Agreement:

Any mailing list you or your chosen mailing house receive is subject to a one-time use condition. This One-Time Use Agreement must be signed before the order will be processed.

The recipient of the BOC list hereby agrees that the information provided will not be stored, duplicated, copied or reproduced in any manner, nor will it be used for any purpose other than a one-time mailing of the recipient's materials. Promotional materials must adhere to the aforementioned guidelines and be submitted to the BOC for approval at time of order.

BOC is not responsible for returned items due to incorrect mailing addresses or email addresses. The BOC relies on ATs to inform us of address changes, and the BOC stresses to all ATs the importance of notifying the BOC when an address has changed.

By completing the information below, you are indicating that you have read and understand the terms of use stated above.

Purpose of Email/Mailing: Completion of EdD coursework

Date Mailing List Needed: _____ Signature: Aedryan Cox

Or

Date of Email Blast: 6/17/2016 Date Signed: 6/14/2016
(Monday - Friday)

Email content or prepared HTML must be provided to the BOC 3-5 business days prior to scheduled email date.

Appendix C: BOC Email Invoice 1

Board of Certification, Inc.
1415 Harney Street, Suite 200, Omaha, NE 68102
Phone (877) 262-3926 Fax (402) 561-0598 Sales@bocatc.org

INVOICE #1565

Customer
Lindenwood University
Aedryan Cox
1052 Arlington Drive
St. Charles, MO 63303

Phone 513-881-4902

Invoice Date 6/22/2016
Sales Person Mindy Lindquist
P.O. #

Job	Payment Due	Payment Terms
all cert - Univ/College-Educator setting		Due on Receipt

Service	Hours	Rate	Line Total
Template Set-Up Fee - discounted rate	1	$60.00	$60.00
Product	**Quantity**	**Unit Price**	**Line Total**
Email Address - Researcher rate	803	$0.12	$96.36

Researcher

Credit Card Auth # AR0AD6DCA604

Services Total	$60.00
Products Total	$96.36
Taxes	$0.00
Invoice Total	**$156.36**
Payment Amount	**$156.36**
Amount Due	**$0.00**

Thank you for your business

Board of Certification, Inc. 1415 Harney Street, Suite 200, Omaha, NE 68102
Phone (877) 262-3926 Fax (402) 561-0598 Sales@bocatc.org

Page 1 of 1

Appendix D: BOC Email Invoice 2

Board of Certification, Inc.
1415 Harney Street, Suite 200, Omaha, NE 68102
Phone (877) 262-3926 Fax (402) 561-0598 Sales@bocatc.org

INVOICE #1565

Customer
Lindenwood University
Aedryan Cox
1052 Arlington Drive
St. Charles, MO 63303

Phone 573-881-4902

Invoice Date 6/22/2016
Sales Person Mindy Lindquist
P.O. #

Job	Payment Due		Payment Terms
all cert - Univ/College-Educator setting			Due on Receipt

Service	Hours	Rate	Line Total
Template Set-Up Fee - discounted rate	1	$60.00	$60.00
Product	**Quantity**	**Unit Price**	**Line Total**
Email Address - Researcher rate	803	$0.12	$96.36

Researcher

Credit Card Auth # AR0AD6DCA604

Services Total	$60.00
Products Total	$96.36
Taxes	$0.00
Invoice Total	**$156.36**
Payment Amount	**$156.36**
Amount Due	**$0.00**

Thank you for your business

Board of Certification, Inc. 1415 Harney Street, Suite 200, Omaha, NE 68102
Phone (877) 262-3926 Fax (402) 561-0598 Sales@bocatc.org

Page 1 of 1

Appendix E: BOC Email Tracking Report 1

Cox, Aedryan N.

From: Mindy Lindquist <mindyl@bocatc.org>
Sent: Monday, June 20, 2016 11:51 AM
To: Cox, Aedryan N.
Subject: BOC Tracking Report

Hello Aedryan! Below is a tracking report for the instructor email blast BOC sent on your behalf on Friday. Let me know if you have any questions. Thank you!

Email Campaign Tracking Report

Project	Aedryancoxresearchinstructor20160617
Campaign ID	17294
Start Date	6/17/2016 14:06:36
Report Date	6/20/2016 11:49:55
Elapsed Time	2 days, 21 hours
Mailing Duration	17 minutes, 6 seconds
Emails Tracked	779
Opens	364 (47%)
Reopens	169
Forwards	87
Average View Time	81.1 seconds
Average Interest Score	16.6
Average Time Until Opened	7 hours, 56 minutes
Shortest Time Until Opened	3 seconds
Longest Time Until Opened	2 days, 20 hours
Reopen Rate	23.6%
Forward Rate	3.6%
Total Links Clicked	64 (0.18 per open)
Emails With 1+ Links Clicked	59 (0.19 per open)
Links Clicked/Opened	48 (70%)
Links Clicked/Unopened	21 (30%)
Estimated Opens	490 (63%)

Link Tracking

Appendix F: BOC Email Tracking Report 2

Cox, Aedryan N.

From: Mindy Lindquist <mindy@bocatc.org>
Sent: Thursday, June 23, 2016 2:40 PM
To: Cox, Aedryan N.
Subject: BOC Tracking Reports

Hello Aedryan! Below are tracking reports for the e mail blasts BOC sent on your behalf on June 17 and June 20. Let me know if you have any questions. Thank you!

Educator Email

Email Campaign Tracking Report

Project	Aedryancoxresearchinstructor20160617
Campaign ID	17294
Start Date	6/17/2016 14:06:36
Report Date	6/23/2016 14:39:01
Elapsed Time	6 days, 0 hours
Mailing Duration	17 minutes, 6 seconds
Emails Tracked	779
Opens	389 (50%)
Reopens	199
Forwards	97
Average View Time	78.7 seconds
Average Interest Score	16.7
Average Time Until Opened	13 hours, 26 minutes
Shortest Time Until Opened	3 seconds
Longest Time Until Opened	5 days, 18 hours
Reopen Rate	25.4%
Forward Rate	4.1%
Total Links Clicked	71 (0.18 per open)
Emails With 1+ Links Clicked	76 (0.20 per open)
Links Clicked/Opened	54 (71%)
Links Clicked/Unopened	22 (29%)
Estimated Opens	502 (64%)

Link Tracking

Appendix G: BOC Email Tracking Report 3

Cox, Aedryan N.

From: Mindy Lindquist <mindyl@bocatc.org>
Sent: Friday, June 24, 2016 1:55 PM
To: Cox, Aedryan N.
Subject: BOC Tracking Report

Hello Aedryan! Below is a tracking report for the educator email blast BOC sent on your behalf on June 17. Let me know if you have any questions. Thank you!

Email Campaign Tracking Report

Project	Aedryancoxresearchinstructor20160617
Campaign ID	17294
Start Date	6/17/2016 14:00:36
Report Date	6/24/2016 13:53:06
Elapsed Time	6 days, 23 hours
Mailing Duration	17 minutes, 6 seconds
Emails Tracked	779
Opens	389 (50%)
Reopens	202
Forwards	103
Average View Time	78.3 seconds
Average Interest Score	16.9
Average Time Until Opened	13 hours, 26 minutes
Shortest Time Until Opened	3 seconds
Longest Time Until Opened	5 days, 18 hours
Reopen Rate	25.7%
Forward Rate	4.1%
Total Links Clicked	72 (0.19 per open)
Emails With 1+ Links Clicked	77 (0.20 per open)
Links Clicked/Opened	55 (71%)
Links Clicked/Unopened	22 (29%)
Estimated Opens	500 (64%)

Link Tracking

Appendix H: BOC Email Tracking Report 4

Cox, Aedryan N.

From: Mindy Lindquist <mindyl@bocatc.org>
Sent: Monday, June 27, 2016 10:50 AM
To: Cox, Aedryan N.
Subject: BOC Tracking Report

Hello Aedryan! Below is a tracking report for the Student email blast BOC sent on your behalf on June 20. Let me know if you have any questions. Thank you!

Email Campaign Tracking Report

Project	Aedryancoxresearchstudent20160617
Campaign ID	17298
Start Date	6/20/2016 9:37:17
Report Date	6/27/2016 10:28:17
Elapsed Time	7 days, 0 hours
Mailing Duration	1 hour, 49 minutes
Emails Tracked	2584
Opens	1527 (59%)
Reopens	508
Forwards	399
Average View Time	95.7 seconds
Average Interest Score	14.2
Average Time Until Opened	8 hours, 18 minutes
Shortest Time Until Opened	6 seconds
Longest Time Until Opened	6 days, 23 hours
Reopen Rate	22.2%
Forward Rate	5.0%
Total Links Clicked	125 (0.08 per open)
Emails With 1+ Links Clicked	129 (0.08 per open)
Links Clicked/Opened	121 (94%)
Links Clicked/Unopened	8 (6%)
Estimated Opens	1593 (62%)

Link Tracking

1

Appendix I: Athletic Training Student Email Invitation

Athletic Training Student Invitation

Dear Ma'am/Sir,

My name is Aedryan Cox, and I am an instructor/athletic trainer at Lindenwood University. I am conducting research into instructional strategies within athletic training curricula and a possible relationship to first-attempt Board of Certification (BOC) examination scores. This study will contribute to the development of athletic training education programs nationwide, and your participation is essential. This study has been developed in partial completion of the Educational Doctorate Program at Lindenwood University.

In order to participate in this study, you will be required to complete a survey which documents your perception of various aspects with your athletic training education program. Participation in this survey is completely voluntary, and no personal information will be obtained or published throughout the course of the research. The following survey should take between 10-15 minutes to complete, and the final submission of the survey will serve as your consent to participate in the study.

All surveys must be completed by July 29th, 2016.

Interested participants please click the link below, or copy and paste into your web browser:

https://lindenwood.qualtrics.com/SE/?SID=SV_9EsBbmKkxiPywjH

Thank you in advance for your time and consideration in study.

Aedryan Cox
Doctoral Student at Lindenwood University
acox@lindenwood.edu
573-881-4902

Appendix J: Athletic Training Instructor Email Invitation

Athletic Training Instructor Version

Dear Ma'am/Sir,

My name is Aedryan Cox, and I am an instructor/athletic trainer at Lindenwood University. I am conducting research into instructional strategies within athletic training curricula and a possible relationship to first-attempt Board of Certification (BOC) examination scores. This study will contribute to the development of athletic training education programs nationwide, and your participation is essential. This study has been developed in partial completion of the Educational Doctorate Program at Lindenwood University.

In order to participate in this study, you will be required to complete a survey which documents your perception of various aspects with your athletic training education program. Participation in this survey is completely voluntary, and no personal information will be obtained or published throughout the course of the research. The following survey should take between 10-15 minutes to complete, and the final submission of the survey will serve as your consent to participate in the study.

All surveys must be completed by July 29th, 2016.

Interested participants please click the link below, or copy and paste into your web browser:

https://lindenwood.qualtrics.com/SE/?SID=SV_55pu7FwuR5DXiN7

Thank you in advance for your time and consideration in study.

Aedryan Cox
Doctoral Student at Lindenwood University
acox@lindenwood.edu
573-881-4902

Appendix K: ISII Survey Instrument

Instructional Strategy Intake Instrument (Athletic Training Student Version)

General Information:
Do you complete the BOC examination for the first time in the 2015 calendar year?: Yes No
First Attempt Score on the BOC: 200-299 300-399 400-499 500-599 600-699 700-800
What type of athletic training education program prepared you for the BOC examination: Undergraduate Master's Doctorate

---

The following questionnaire is meant to measure instructional strategies within athletic training education programs around the nation. For each prompt, please select the option which best correlates to your experience in the athletic training program that you attended.

Shaded information will not be included in the actual survey

Prevalence (Frequency)				
Throughout your athletic training courses, how often did you take part in the following learning activities:				
	Never (0 times)	**Sometimes** (1-10 times)	**Often** (11-20 times)	**Very Often** (>20 times)
Peer Influence Instruction (Null Hypothesis 1)				
Teaching information to classmates (group presentations, lectures, etc.)				
Learning in small groups with your instructors (2-5 students)				
Competitive group activities (competing in groups against classmates)				
Peer-tutoring (receiving/providing tutoring sessions)				

Feedback & Meta-cognitive Instruction (Null Hypothesis 3)				
Receiving feedback from the instructor on homework/assignments				
Receiving feedback from classmates on homework/assignments				
Providing feedback to the instructor on homework/assignments				
Providing feedback to classmates on homework/assignments				
Inductive Instruction (Null Hypothesis 5)				
Receiving an open-ended question from the instructor				
Receiving questions based on case scenarios or patient presentations			`	
Completing a project/presentation based on a specific set of instructions				
Completing a project/presentation with limited instructions or direction				
Teacher-Centered Instruction (Null Hypothesis 7)				
Traditional lectures				
Observing the step by step instructions for a task/assignment				
Homework/out of class assignments				
Classroom discussion led by the instructor				

Quality					
How effective were the following strategies in preparing you for the BOC examination:					
	No opinion	**Extremely unhelpful**	**Somewhat unhelpful**	**Somewhat helpful**	**Extremely helpful**
Peer Influence Instruction (Null Hypothesis 2)					
Teaching information to classmates (lecturing, group presentations, etc.)					
Learning in small groups with your instructors (2-5 students)					
Competitive group activities (competing in groups against classmates)					
Peer-tutoring (receiving/providing tutoring sessions)					
Feedback & Meta-cognitive Instruction (Null Hypothesis 4)					
Receiving feedback from the instructor on homework/assignments					
Receiving feedback from classmates on homework/assignments					
Providing feedback to the instructor on homework/assignments					
Providing feedback to classmates on homework/assignments					
Inductive Instruction (Null Hypothesis 6)					
Receiving an open-ended question from the instructor					

Receiving questions based on case scenarios or patient presentations					
Completing a project/presentation based on a specific set of instructions					
Completing a project/presentation with limited instructions or direction					
Teacher-Centered Instruction (Null Hypothesis 8)					
Traditional lectures					
Observing the step by step instructions for a task/assignment					
Homework/out of class assignments					
Classroom discussion led by the instructor					

Open-Ended Questions

Interview Question 1: Describe your experience with peer learning exercises (i.e. group work, peer tutoring, teaching to classmates, etc.) within your athletic training education program. Please explain thoroughly. (RQ1)

Interview Question 2: Discuss learning opportunities that you have encountered which may have benefitted from peer learning exercises. Please explain thoroughly. RQ1)

Interview Question 3: Describe your experience with feedback activities (teacher-student, student-teacher, student-student) within your athletic training program. Please explain thoroughly. (RQ2)

Interview Question 4: Discuss learning opportunities that you have encountered which may have benefitted from feedback activities. Please explain thoroughly. RQ2)

Interview Question 5: Describe your experience with questioning exercises (when an instructor challenged you with a difficult question or concept) within your athletic training education program. Please explain thoroughly. (RQ3)

Interview Question 6: Discuss learning opportunities that you have encountered which may have benefitted from questioning exercises. Please explain thoroughly. RQ3)

Interview Question 7: Describe your experience with lectures within your athletic training education program. Please explain thoroughly. (RQ4)

Interview Question 8: Discuss learning opportunities that you have encountered which may have benefitted from lectures. Please explain thoroughly. RQ4)

Interview Question 9: What instructional strategies are the most appropriate for athletic training courses? Please explain thoroughly. (RQ1-4)

Instructional Strategy Intake Instrument (Instructor Version)

General Information:

Do you currently teaching within an athletic training education program: Yes No

Within which CAATE content areas do you primarily instruct? (Select all that apply)

Evidence-Based Practice	Prevention and Health Promotion	Clinical Examination and Diagnosis
Acute Care of Injury and Illness	Therapeutic Interventions	Psychosocial Strategies & Referral
Healthcare Administration	Professional Development & Responsibility	

What type of athletic training education program do you instruct in: Undergraduate Master's Doctorate

The following questionnaire is meant to measure instructional strategies within athletic training education programs around the nation. For each prompt, please select the option which best correlates to your experience in the athletic training program in which you instruct.

Shaded information will not be included in the actual survey

Prevalence (Frequency)				
Throughout your athletic training education program, how many times do your students experience the following learning activities:				
	Never (0 times)	**Sometimes** (1-10 times)	**Often** (11-20 times)	**Very Often** (>20 times)
Peer Influence Instruction (Null Hypothesis 1)				
Teaching information to classmates (lecturing, group presentations, etc.)				
Learning in small groups with your instructors (2-5 students)				
Competitive group activities (competing in groups against classmates)				
Peer-tutoring (receiving/providing tutoring sessions)				
Feedback & Meta-cognitive Instruction (Null Hypothesis 3)				
Receiving feedback from the instructor on homework/assignments				
Receiving feedback from classmates on homework/assignments				

Providing feedback to the instructor on homework/assignments					
Providing feedback to classmates on homework/assignments					
Inductive Instruction (Null Hypothesis 5)					
Receiving an open-ended question from the instructor					
Receiving questions based on case scenarios or patient presentations				`	
Completing a project/presentation based on a specific set of instructions					
Completing a project/presentation with limited instructions or direction					
Teacher-Centered Instruction (Null Hypothesis 7)					
Traditional lectures					
Observing the step by step instructions for a task/assignment					
Homework/out of class assignments					
Classroom discussion led by the instructor					
Quality					
How effective were the following strategies in preparing students for the BOC examination:					
	No opinion	**Extremely unhelpful**	**Somewhat unhelpful**	**Somewhat helpful**	**Extremely helpful**

Peer Influence Instruction (Null Hypothesis 2)					
Teaching information to classmates (lecturing, group presentations, etc.)					
Learning in small groups with your instructors (2-5 students)					
Competitive group activities (competing in groups against classmates)					
Peer-tutoring (receiving/providing tutoring sessions)					
Feedback & Meta-cognitive Instruction (Null Hypothesis 4)					
Receiving feedback from the instructor on homework/assignments					
Receiving feedback from classmates on homework/assignments					
Providing feedback to the instructor on homework/assignments					
Providing feedback to classmates on homework/assignments					
Inductive Instruction (Null Hypothesis 6)					
Receiving an open-ended question from the instructor					
Receiving questions based on case scenarios or patient presentations					

Completing a project/presentation based on a specific set of instructions					
Completing a project/presentation with limited instructions or direction					
Teacher-Centered Instruction (Null Hypothesis 8)					
Traditional lectures					
Observing the step by step instructions for a task/assignment					
Homework/out of class assignments					
Classroom discussion led by the instructor					

Open-Ended Questions

Interview Question 1: Describe the role of group learning activities (i.e. group work, peer tutoring, teaching to classmates, etc.) within the athletic training education program. Please explain thoroughly. (RQ1)

Interview Question: Discuss learning opportunities that you have encountered which may have benefitted from group learning activities. Please explain thoroughly. RQ1)

Interview Question 3: Describe the role of feedback activities (teacher-student, student-teacher, student-student) in within the athletic training education program. Please explain thoroughly. (RQ2)

Interview Question 4: Discuss learning opportunities that you have encountered which may have benefitted from feedback activities. Please explain thoroughly. RQ2)

Interview Question 5: Describe the role of inductive instruction activities (teaching by creating problems to solve) within the athletic training education program. Please explain thoroughly. (RQ3)

Interview Question 6: Discuss learning opportunities that you have encountered which may have benefitted from inductive instruction activities. Please explain thoroughly. RQ3)

Interview Question 7: Describe the role of lecturing within athletic training education programs. Please explain thoroughly. (RQ4)

Interview Question 8: Discuss learning opportunities that you have encountered which may have benefitted from lecturing. Please explain thoroughly. RQ4)

Interview Question 9: What instructional strategies are the best for athletic training courses? Please explain thoroughly. (RQ1-4)

Vitae

Aedryan N. Cox
Athletic Trainer/Instructor
Lindenwood University

Education

Doctor of Education in Instructional Leadership - *Emphasis in Higher Education Administration*
Lindenwood University, St. Charles *Anticipated Graduation – Fall 2016*

Master of Arts in Education - *Emphasis in Health/Physical Education*
Lindenwood University, St. Charles, MO *Fall 2012 – May 2014*
- Cumulative GPA: 4.0

Bachelor of Science in Athletic Training
Lindenwood University, St. Charles, MO *Fall 2008 – Spring 2012*
- Cumulative GPA: 3.84

Professional Memberships/Certifications

M1/M2 Graston Certified Technician	*Fall 2014 - Present*
Board of Certification, Certified Athletic Trainer, #2000009843	*May 2012 - Present*
Missouri Board of Healing Arts, Licensed AT #201201727	*May 2012 - Present*
St. Louis Athletic Trainers' Association Member	*May 2012 - Present*
National Athletic Trainers' Association Member, #51204	*December 2011 - Present*
American Red Cross, Professional Rescuer	*October 2011- Present*
Missouri Athletic Trainers' Association Member	*September 2009 - Present*

Educational Experience

Instructor
Lindenwood University, St. Charles, MO *Fall 2014 – Present*
Courses instructed included: Medical Terminology, Care and Prevention of Athletic Injuries, Assessment of Athletic Injuries – Lower Body Lab, Assessment of Athletic Injures – Upper Body Lab, Clinical II, Current Topics in Athletic Training, and Pharmacology

Clinical Preceptor
Lindenwood University, St. Charles, MO *Fall 2012 - Present*
Responsibilities include the supervision of undergraduate athletic training students during clinical rotation through providing critical thinking scenarios which allow students to apply classroom knowledge to the clinical setting, encouraging ongoing

education through the research of current evidence based practices among other professionals, and maintaining a work schedule for the athletic training students under my supervision.

Guest Lecturer

Lindenwood University, St. Charles, MO *Fall 2014 – Present*

Served as a guest lecturer in the following courses: Foundations of Exercise Science, Orthopedic Injury Pathology and Exercise

Teacher's Assistant – Upper/Lower Body Assessment of Athletic Injuries

Lindenwood University, St. Charles, MO *Spring 2013 - Present*

Responsibilities include assisting with creating course outline, course objectives, and syllabus; compiling the associated lab booklets for each course; creating and implementing lessons plans; researching current evidence based practices in order to supply students with a wide exposure of modern practices; proctoring practical examinations; and analyzing curriculum data for the purpose of improving teaching effectiveness and efficiency.

Foundation of Education - Observation Student

Fort Zumwalt South High School, St. Charles, MO *Spring 2013*

Responsibilities included observing Physical Education and Health classes, and assisting the teacher with all classroom duties (i.e. attendance, grading tests, classroom set-up/breakdown, etc.)

Athletic Training Experience

Assistant Athletic Trainer – *Football, Men's Rugby, Baseball*

Lindenwood University, St. Charles, MO *Fall 2012 - Present*

Responsibilities include communicating student-athlete status with the head athletic trainer, coaching staff, and compliance department, coordinating student-athlete status with outside physicians and insurance companies, designing and implementing rehabilitation programs for injured athletes, administering pre-participation examinations, field preparation and maintenance before and after practices/games, and generating reports regarding student-athlete status using Sportsware Online software.

PRN Athletic Trainer

St. Louis Athletic Training Services, Wentzville, MO *Winter 2012 – Present*

Responsibilities include the firsthand care and prevention of athletic injuries for high school athletes, and coordinating the management of emergency situations with the appropriate medical professions.

Assistant Athletic Trainer

Warren County Cyclones Football Team (GMFL), Warrenton, MO *Summer 2013*

Responsibilities included the emergency care and prevention of athletic injuries during games and practice for semi-professional athletes, and coordinating event coverage between the head athletic trainer and team physician.

Head Athletic Trainer

Missouri Monsters Football Team (UIFL), St. Charles, MO *Spring 2013*

Responsibilities included the care and prevention of athletic injuries for the professional athletes, coordinating with physicians, coaching staffs, and insurance companies, ordering and maintaining all health-care related supplies, maintaining medical records and documentation, and designing and implementing therapeutic rehabilitation plans for the injured athletes.

Intern Athletic Trainer

St. Louis Rams Earth City, MO *Summer 2012*

Responsibilities included assisting the St. Louis Rams athletic training staff with all daily functions including: field setup and breakdown for practice and games, providing prophylactic taping and stretching for professional athletes, carrying out therapeutic rehabilitation procedures and protocols, and assisting with inventory upkeep onsite and during away events.

Research Experience

Ed.D. Dissertation

Lindenwood University, St. Charles, MO *Spring 2015 - Present*

Topic: Identification of research based instructional methods within athletic training curricula and the impact on the first-attempt BOC pass rate

- Prospectus/IRB approval received

Thesis Committee Member

Lindenwood University, St. Charles, MO *Spring 2015-Present*

Serve as committee member for Human Performance graduate students

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Professional Activities

Athletic Training Day

Lindenwood University, St. Charles, MO *Fall 2015*

Organized and hosted an Athletic Training/Sports Medicine Clinic on campus for local high school students. The event was intended to inform attendees of the variety of career opportunities available in the realm of sports medicine. The clinic also served as a platform for presenting the opportunity to pursue a higher education degree at Lindenwood University.

GAC Sports Education Seminar Speaker

Francis Howell Central High School, St. Charles, MO *Fall 2015*

Topic: Hurt vs. Injured: When to play through the pain

Technology Committee Member

Lindenwood University, St. Charles, MO *Spring2015 – Present*

Emergency Skills Lab Panel Member

Missouri Athletic Trainer's Association, St. Louis, MO *Summer 2013*

Responsibilities included discussing current evidence based practice trends on the emergency care of the cervical spine injured athlete with other members of the panel, assisting in the creation of a multi-media presentation of current approved

techniques for the care of the injured athlete, and assisting as an instructor during the lab presentation of the material.

Personal Honors

- 2012 St. Louis Rams Minority Scholarship Recipient
- 2011 Capital One Academic All-District First Team
- 2010-2011 NAIA Wrestling All-American
- 2011 NAIA Wrestling Academic All-American
- 2010-2011 Lindenwood Wrestling Team Captain
- 2009-2012 Fall/Spring Dean's List
- 2009-2012 Lindenwood University Student Athletic Training Program Organization Member