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Attributes of an exemplary curriculum in entry-level undergraduate athletic training education

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ATTRIBUTES OF AN EXEMPLARY CURRICULUM IN ENTRY-LEVEL UNDERGRADUATE ATHLETIC TRAINING EDUCATION

A Dissertation in Curriculum Studies

By

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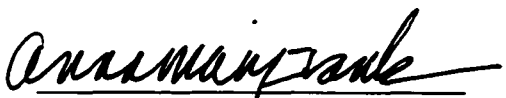

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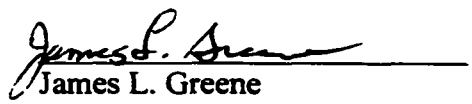

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Abstract

Athletic training is an allied health profession that is currently undergoing reform of its educational curriculum standards and requirements for education programs. The profession continues to evolve in the academic preparation of future athletic trainers through improvements in the didactic and experiential aspects of the curriculum. Nevertheless initial passing rates on the National Athletic Trainers' Association Board of Certification (NATABOC) examination are consistently low. The purpose of this study was to examine entry-level undergraduate athletic training curricula accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) to determine what elements constitute an exemplary curriculum and to formulate a model of an exemplary curriculum for others to replicate.

It was hypothesized that an exemplary curriculum in entry-level undergraduate athletic training education exhibits a substantial exposure to clinical experiences, provides a variety of athletic training coursework, and provides intense program requirements. It was also hypothesized that an exemplary curriculum in entry-level undergraduate athletic training would prepare individuals to pass the NATABOC examination on the first attempt at a greater rate than curricula that do not include the elements of an exemplary curriculum.

An objective of this research was to identify correlations between elements of an exemplary curriculum and initial success on the NATABOC examination. Data were collected via a questionnaire from 63 program directors of CAAHEP accredited undergraduate athletic training programs. Information regarding success rates for first-

time NATABOC examinees during the 2000-2001 academic year, and data related to a variety of curriculum variables that may contribute to examination success were obtained.

The results of the study indicate that all but one of the curriculum variables related to clinical education, courses and instruction, and program intensity are not positively related to initial success on the NATABOC examination. Additionally, no significant difference was found between programs with high rates of initial examination success and those programs that experience low success rates in terms of the variables tested.

One element that correlates positively with initial success on the NATABOC examination is the number of clinical opportunities provided by a program. Although results of this study did not identify other statistically significant components of an ideal curriculum for athletic training, it demonstrates the importance of the experiential aspect of the curriculum. The results of this study have implications to the field suggesting that athletic training educators incorporate a comprehensive clinical experience in their curricula to enhance the preparation of future graduates and increase programmatic outcomes.

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Introduction

The field of athletic training is currently in a state of change, in that the standards for the preparation of future athletic trainers are under revision. A major issue in this profession over the last 15 years concerns the effectiveness of the educational programs and the standardization of athletic training education. The reform movements in athletic training have made great efforts to increase the overall effectiveness of its education programs, but these developments have not yet been correlated with significant improvements in educational outcomes. One outcome of particular importance to the field is passing rate on the National Athletic Trainers' Association Board of Certification (NATABOC) examination, the standardized test that leads to national certification in athletic training.

This study was performed to investigate specific elements of entry-level undergraduate athletic training curricula in an attempt to identify factors that may lead to better success on the NATABOC examination. This chapter presents the current problem in athletic training education and discusses the intended purpose of this research. A discussion of the study's significance is also presented as well as the definitions of the key concepts of this study.

Statement of Purpose

The purpose of this study was to examine entry-level undergraduate athletic training curricula accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) to determine what elements constitute an exemplary curriculum. The study analyzed correlations between the elements of individual curricula and initial success rates of graduates on the National Athletic Trainers Association Board

of Certification examination. A second purpose of this study was to identify an exemplary curriculum in entry-level undergraduate athletic training education to formulate a model from the research of an ideal curriculum for others to replicate.

Background

Athletic trainers are health care practitioners who are responsible for the prevention, evaluation, treatment, and the rehabilitation of injuries in physically active individuals. The field of athletic training is evolving and constantly changing its educational requirements in an attempt to increase professional development and recognition with other allied health care professions. Such changes in the education of athletic training promote a standardization of the education process and enhance consistency with professional preparation in other allied health disciplines (Delforge & Behnke, 1999). In 1959, the National Athletic Trainers Association (NATA) began to mandate the successful completion of academic course work in athletic training (Delforge & Behnke, 1999). Colleges and universities began to incorporate academic courses to prepare students in becoming certified athletic trainers and passing the certification examination through changes in existing curricula.

Another step in improving athletic training education was the beginning of an accreditation process that required all programs to offer a major in athletic training. This policy was initiated by the NATA Board of Directors in 1990 as a means of improving athletic training education (Delforge & Behnke, 1999). Currently, there exist two routes to certification through which one can become a certified athletic trainer. One route consists of students completing a curriculum program in which a degree in athletic training is awarded through the completion of a curriculum consisting of both didactic

and experiential course work. This program is an accredited major approved by the Commission on Accreditation of Applied Health Education Programs (CAAHEP). The second route includes students participating in a work-based internship program offered by the college or university in which students receive experience through many hours of hands-on clinical work (Starkey, 2000), and completion of a course in health, human anatomy, human physiology, kinesiology/biomechanics, exercise physiology, basic athletic training, and advanced athletic training.

In 1994, the NATA Board of Directors mandated that all athletic training programs must meet accreditation standards including the requirement of graduation from an accredited institution and earning a degree in athletic training as a prerequisite for the certification examination. This mandate will ultimately eliminate the internship route to certification. By the year 2004 all programs must meet these standards and offer an accredited curriculum to athletic training students (Starkey, 2000). This means that all undergraduate athletic training curriculum programs must meet appropriate standards as set forth by the Joint Review Committee of Athletic Training Educational Programs (JRC-AT) to become CAAHEP accredited institutions.

A recognized responsibility of the certified athletic trainer is to supervise the student athletic trainer during his/her educational clinical experience (Vanic, 1998). With this in mind, meeting and maintaining the changing educational needs of the student athletic trainer is of great importance. Curricular reform of athletic training educational programs is a change currently in progress at colleges and universities in the United States to improve professional development and comply with the requirements and meet needs of our student population. Additionally, the reform process is an attempt to

upgrade undergraduate athletic training education through the restructuring of curricula and regulation of educational activities (Mathies, Denegar, & Arnhold, 1995). Recent changes have been made in the educational process for all undergraduate athletic training educational programs. The 2004 deadline for academic programs to comply with the newly revised standards for accreditation is one such change. This example of education reform has led to substantial improvements in the athletic training profession (Delforge & Behnke, 1999).

One approach to this reform is to qualify the clinical education experience with purposeful objectives rather than chance learning experiences (Laurent & Weidner, 2001). This kind of approach embraces the philosophy of Ralph W. Tyler in that clinical education and the experiential component of the curriculum is designed around appropriate learning objectives and organized in a manner that will have a maximum cumulative effect (Tyler, 1949). It is hoped that the curricular improvements as a result of the reform movement will result in curricula that thoroughly prepares athletic training students for passing the National Athletic Trainers' Association Board of Certification examination and obtaining employment upon graduation.

Although all CAAHEP accredited academic programs must meet minimum standards in the curriculum it is not uncommon that institutions offer many additional experiences such as additional course work, clinical experiences, and learning objectives to enhance their individual curriculum. This diversity and change increase the significance of the need to study the aspects of new and existing athletic training curricula and determine what makes them successful. Additionally, there is a need to improve educational curricula in athletic training that enable students to become more

marketable in a competitive job market. This will assist athletic training students in becoming highly marketable new graduates by offering them a curriculum that better prepares them for the certification examination and future employment.

Statement of the Problem

As education reform in athletic training continues and the number of CAAHEP accredited athletic training undergraduate education programs increase, so will the competition for quality athletic trainers in a fast growing job market. According to Williams (1998) the restructuring of the athletic training curriculum is an effort to help increase passing rates on the certification examination. When considering the number of students who fail the National Athletic Trainers' Association Board of Certification (NATABOC) examination each year it is evident that students are not prepared adequately to pass the examination on the first attempt. Starkey and Henderson (1995) found that all first-time certification candidates from both internship and accredited curricula passed the examination at a rate of 27%. Additionally, in 1996 only 27% of the examinees passed the NATABOC examination on the first attempt (NATABOC, 1996). Similar passing rates were found for the subsequent years of examination data with only 32% of the candidates passing the examination on the first attempt in 1997 (NATABOC, 1997), 31% in 1998 and 1999 respectively, (NATABOC, 1998 and NATABOC 1999), 37% in the year 2000 (NATABOC, 2000), and 34% during 2001 (NATABOC, 2001). Data from these studies when examined independently indicated that curriculum-based students have a higher passing rate than their internship-based counterparts (Starkey & Henderson, 1995; NATABOC, 1996; NATABOC, 1997; NATABOC, 1998; NATABOC, 1999; NATABOC, 2000; NATABOC, 2001).

The adoption of the competency-based curriculum approach to the accreditation of entry-level athletic training undergraduate programs will hold institutions accountable for teaching students a minimum amount of competencies relevant to the field. This means that all CAAHEP accredited undergraduate athletic training programs will teach the same competencies but in various methods throughout the individual curricula, thus the experiential component of the curricula may vary between institutions. Although programs are implementing a Deweyan experiential philosophy, the manner of which it is implemented may make a difference in skill acquisition and proficiency as well as programmatic outcomes.

Delforge and Behnke (1999) reported that the accreditation process was proposed to enhance consistency and standardize athletic training education. The standardization of the educational curricula will mean that all accredited athletic training programs offer the minimum amount of competencies per the standards set forth by CAAHEP. At the same time institutions may choose to teach competencies that go above and beyond what CAAHEP states as the minimum requirements. Additionally, some programs may implement other curricular aspects in excess of what is required by the standards; thus making their program exemplary compared to others. Examples of these curricular aspects may include program length, ratio of students to clinical instructors, supervision of clinical experiences, number of clinical rotations required in the clinical aspect of the program, use of allied health professionals for instruction, and the number of athletic training-related courses offered in the curriculum. These curricular enhancements are ultimately an application of the Dewey philosophy of experiential learning as well as embedded with Tyler's rationale of learning objectives (Dewey, 1938; Tyler, 1949).

This study identified the attributes of several athletic training curricula that contribute to success on the NATABOC examination. The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what elements constitute an exemplary curriculum and to formulate a model of an exemplary curriculum for others to replicate. The need to determine what attributes make an exemplary curriculum is important to help students select a program that will suit their needs as well as prepare them for success in the future. In addition, there is a need to explore the experiential aspect of the curricula to determine if it correlates positively with increased success on the NATABOC examination. At this point, it is apparent that a problem exists in the preparation of athletic training students for the NATABOC examination. Perhaps the clinical aspect of the athletic training curricula is based more on a Deweyan philosophy and lacks the structural organization around specific sets of learning objectives as recommended by Tyler. Nevertheless is evident that additional research is needed to identify salient issues in athletic training education to improve the quality of future graduates in athletic training.

Operational Definitions

Several terms were used in this study that are unique to athletic training education. The following list of terms and their definition is provided to clarify the research. The definitions were developed by the researcher as well as other specific sources that are provided.

Accredited athletic training program – An athletic training education program that is accredited by the Commission on Accreditation on Allied Health Education Programs (CAAHEP).

Allied health professional – An individual trained in the art of an allied health profession. These include but are not limited to dentist, nurse, physical therapist, occupational therapist, and physician and the medical specialties including orthopedics, family practice, internal medicine, physical medicine, dermatology, neurology, cardiology, pediatrics, ophthalmology, etc.

Athletic training competencies - The educational content required of entry-level athletic training programs. These competencies should be used to develop the curriculum and educational experiences of students enrolled in CAAHEP-accredited entry-level athletic training education programs (Athletic Training Educational Competencies, 1999).

Clinical education – Clinical education represents the athletic training students' formal acquisition , practice, of the Entry-Level Athletic Training Clinical Proficiencies through classroom, laboratory, and clinical education experiences under the direct supervision of a clinical instructor (NATA Education Council, 2001).

Clinical experience – Clinical education experience provides an opportunity for integration of psychomotor, cognitive, and affective skills, and clinical proficiencies within the context of direct patient care (NATA Education Council, 2001).

Clinical site - A location where clinical education takes place. May include the athletic training room on campus or at a high school, hospital, private clinic, or other health care facility.

Clinical opportunity – The opportunity a student has to be exposed to sports of the same and opposite gender as well as team and individual sports.

Core courses – Courses that make up the core of the athletic training curriculum.

Didactic – Academic courses that consist of formal instruction in a classroom environment.

Domains of athletic training – Categories of work-related experiences, per the *NATABOC Role Delineation Study*, 4th edition (2001), which delineate the roles and responsibilities of the certified athletic trainer. The six domains include: 1) Prevention, 2) Recognition, evaluation, and assessment, 3) Immediate care, 4) Treatment, rehabilitation, and reconditioning, 5) Organization and administration, and 6) Professional development and responsibility.

Educational inservice – Lectures, workshops or training given to students in an informal manner to supplement specific topics and to assist in the development of skills.

Experiential – The applied portion of the curriculum in which the theoretical and the practical educational components are integrated into realistic situations with real or simulated patients.

Field experience – Field experience provides the student with the opportunity for informal learning and to practice and apply the Entry-Level Athletic Training Clinical Proficiencies in a clinical environment under the supervision of a clinical instructor. The primary setting for field experiences must include

athletic training rooms, athletic practices, and competitive events (NATA Education Council, 2001).

Instructional methods – methods used for instruction of athletic training courses including but not limited to: lectures, scenarios, class discussions, student presentations, case studies, demonstrations, guest lectures, interactive software, supervised clinical practice, laboratories, videos / films, team teaching, narratives, algorithms, problem solving techniques.

Practicum/Laboratory – A course that is designed to allow for the practice and application of the acquired athletic training skills in a practical setting.

Supervision – Daily personal and verbal contact at the site of supervision between the athletic training student and the clinical instructor who plans, directs, and advises, and evaluates the students' athletic training field experience (NATA Education Council, 2001).

20 subject matter areas – Expanded subject matter areas in which students shall receive formal instruction. These include 1) assessment of injury/illness, 2) exercise physiology, 3) first aid and emergency care, 4) general medical conditions and disabilities, 5) health care administration, 6) human anatomy, 7) human physiology, 8) kinesiology/biomechanics, 9) medical ethics and legal issues, 10) nutrition, 11) pathology of injury/illness, 12) pharmacology, 13) professional development and responsibilities, 14) psychosocial intervention and referral, 15) risk management and injury/illness prevention, 16) strength training and reconditioning, 17) statistics and research design, 18)therapeutic exercise and

rehabilitative techniques, 19) therapeutic modalities, and 20) weight management and body composition (CAAHEP, 2001).

Significance of the Study

This study attempted to identify specific elements from several CAAHEP accredited entry-level undergraduate athletic training curricula that contribute to success on the NATABOC certification examination. The need to determine what attributes constitute an exemplary curriculum is important to help students select a program that will better suit their needs and prepare them for success in the future. In addition, the identification of potential predictors of success on the NATABOC examination can be very useful for athletic training educators and administrators. The findings of this study can assist program directors in making valuable decisions regarding revisions of existing curricula as well as assist in the development of new programs.

This study also attempted to identify characteristics of the athletic training curricula that specifically relate to clinical education, coursework and instruction, and program intensity that may provide a more complete educational experience for athletic training students, better preparing them to achieve success on the NATABOC examination. An additional goal of this study was to develop a model of an exemplary curriculum in entry-level undergraduate athletic training that can be used by athletic training administrators and educators to increase the educational outcomes of their respective programs. The findings of this study can have practical implications in the field of athletic training education and curriculum development. Administrators and educators in the field can use the information provided by this study for the purposes of program enhancement and the development of clinically proficient graduates. With a

better understanding of what curricular characteristics lead to improved success on the NATABOC examination, educators can better prepare their students for the examination as well as their future careers. The results of this study can also make a contribution to the body of knowledge in athletic training education and the field of curriculum. By bridging the results of this study with that of previous curriculum theorists, in this case Dewey and Tyler, athletic training educators will be capable of making specific recommendations to the field about the curricular elements that may help to address the problems with examination success.

Summary

The field of athletic training is currently in a state of educational reform. Efforts are being made to improve the quality of education and academic preparedness for the students of this profession. Although great improvements have been made in the standardization and accountability of the educational process, graduates of athletic training education programs are still having difficulty with initial success on the NATABOC examination. The problem with low passing rates on the NATABOC examination has led to the investigation of identifying curricular attributes that may lead to better examination success as well as the development of a curricular model for others to replicate.

Literature Review

Introduction

This chapter reviews the literature pertaining to the field of athletic training and the issues in athletic training education. Four major topics relevant to athletic training education will be addressed. Areas of concentration within the literature will focus on the history of the athletic training profession, specifically its professional and educational development. In addition, the literature pertaining to qualities of instruction and instructor behaviors will be discussed. The assessment of athletic training and other allied health professions' curricula will be examined as well as the characteristics of curriculum that contribute to academic success.

History of Athletic Training

The history of athletic training and its educational progress is very extensive. In the early 1900's the athletic training profession began (Arnheim & Prentice, 2000). The increasing need for athletic trainers to become more knowledgeable in the areas of medicine, the human body, and exercise eliminated the image of athletic trainers as coaches and teachers (Arnheim & Prentice, 2000). In addition, the need to have an organized means by which colleagues could share ideas on professional development and research results was recognized. According to Delforge and Behnke (1999), establishing the National Athletic Trainers Association (NATA) in 1950 satisfied this need. This was the profession's first attempt in increasing professional growth and recognition. In 1955 the NATA appointed the Committee on Gaining Recognition to further increase the profession's reputation as health care providers (Delforge & Behnke, 1999). This brought to the forefront the issue to study opportunities through which the

athletic training profession could be improved (Schwank & Miller, 1971). The result of this was that decisions were then made that would help the athletic training profession achieve many significant milestones in its development (Grace, 1999).

These significant changes in professional development include the approval of the first athletic training curriculum model in 1959 by the NATA (Delforge & Behnke, 1999). It took several years to develop the curriculum model that would be the academic base for an undergraduate curriculum. It was not until 1969 that the first undergraduate athletic training curriculum was approved by the NATA. At this time only four such programs existed in the United States. The University of New Mexico, Lamar University, Indiana State University, and Mankato State University were the first programs to be recognized by the NATA as approved athletic training curricula (Delforge & Behnke, 1999; Miller, 1999). This marked the beginning of the curriculum evaluation process. This was also one of the five pathways through which eligibility to certification could be attained. In addition to graduating from an approved undergraduate athletic training program, students could also become eligible for certification by completing an apprenticeship program, graduating with a physical therapy degree, being actively engaged within the profession for a specific time frame, and through special consideration by the NATA.

The late sixties and early seventies marked the time when another goal of professional enhancement was achieved. In 1970 the first national certification examination took place (Delforge & Behnke, 1999). The certification process was initiated by Lindsy McLean in 1969 as another method of increasing professional development and respect in the allied health community (Newell, 1984). According to

Grace (1999), McLean encouraged the NATA to develop a written and practical certification examination to address professional issues confronting the NATA. The certification examination remains the final determinant in the certification of athletic trainers. Successful completion of the examination is regarded as the final step in obtaining the "ATC" credential that certifies one to practice the profession.

Other advancements in the professional development of athletic training include the restructuring of the accreditation process. In 1982, the NATA Board of Directors developed a timetable requiring that an athletic training degree be implemented in all of the NATA-approved undergraduate programs by July 1, 1986 (Delforge & Behnke, 1999). A revision of the timetable was made to extend the implementation date to July 1, 1990 (Delforge, 1982). The NATA's Professional Education Committee became the organization by which approval of education programs were granted. The NATA-PEC published in 1983 an edition of the *Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Programs* (Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Programs, 1983). This document contained standards for the development of undergraduate programs in athletic training. It was intended to aid academic institutions in the transition from an approved specialization to a more extensive major.

In addition, the *Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Programs* introduced significant requirements that altered the curriculum design. Its main function was to include requirements of specific subject matter. According to Delforge and Behnke (1999), this function permitted greater flexibility in the development of educational experiences. This

also allowed the subject matter to be designed as separate courses or as instructional units within existing courses. In addition to the *Guidelines for Development and Implementation of NATA Approved Undergraduate Athletic Training Education Programs* a supplemental publication, *Competencies in Athletic Training*, was introduced to give program administrators more guidance as to what was expected to be inclusive in the curriculum. The *Competencies in Athletic Training* document provided a detailed description of specific competencies or learning objectives to be addressed during the educational experience in the athletic training curriculum.

The 1980's also proved to be an essential time in furthering the professional development of athletic training. During this decade, a number of state athletic training associations initiated licensing efforts (Grace, 1999). In addition, the NATA Board of Directors transferred the responsibility and accountability of the certification program to the Board of Certification in 1982 (Grace, 1999). The Board of Certification was given sole responsibility in certification efforts and also examination content. In 1989 the Board of Certification became its own separate organization, forming the National Athletic Trainers' Association Board of Certification (NATABOC). This gave the NATABOC the power and responsibility of certifying athletic training practitioners (Grace, 1999). In order to increase the validity of the certification examination, the NATABOC conducted a role delineation study in 1982. This study was introduced to warrant that the certification examination measured the minimum knowledge and skill level necessary for entry-level certification. The NATABOC identified specific performance domains that widely define the profession in terms of responsibility

concentrations. The domains of athletic training were recognized as 1) prevention of athletic injuries, 2) recognition, evaluation, and immediate care of athletic injuries, 3) rehabilitation and reconditioning of athletic injuries, 4) health care administration, and 5) professional development and responsibility (NATABOC, 1995). The *Role Delineation Study* is conducted periodically to validate athletic trainer responsibilities and keep the NATABOC examination consistent with current practice. Included in the study is an itemization of time spent within each of the identified roles of the athletic trainer.

Another event contributing to the stature of the athletic training profession includes the addition of the athletic training credential in 1987 (Grace, 1999). The "ATC" credential is awarded to individuals who successfully complete the requirements of certification. Prior to this, confusion existed among health care professionals as to the proper method of identifying a "certified athletic trainer". The credential was registered with the US Patent Office and is assigned to the NATA.

Major strides in professional growth and development were established in 1991 when the American Medical Association (AMA) recognized athletic training as an allied health profession (Arnheim & Prentice, 2000). This recognition by the AMA was a key point in the acknowledgement of the importance of the study and practice of athletic training. Support from such an organization added to the professional credibility of the athletic training profession as well as demonstrated a sense of respect from other allied health professions. Although the recognition by the AMA served as a milestone for the athletic training profession, its primary purpose was for the accreditation of health education programs (Arnheim & Prentice, 2000).

The educational growth in athletic training remained a target for improvement so the AMA and the NATA Board of Directors began efforts to seek entry-level accreditation through the AMA's Committee on Allied Health Education and Accreditation (CAHEA) ("AMA endorse athletic training," 1990). The basis for these efforts revolved around the possible benefits of a standardized education program through the review of a specialized accrediting agency. In order for the athletic training profession to be viewed by other allied health professions as one with viable education standards that structure the educational process, it was determined that a review process was needed for athletic training education programs.

In 1990, the NATA Professional Education Committee (PEC) and CAHEA met to establish a review committee that would be responsible for the evaluation and review of the educational programs to be accredited by CAHEA. According to Delforge and Behnke (1999) several allied health organizations involved in the specialization of sports medicine were utilized to form a committee of co-sponsors for the accreditation review process. This effort resulted in the co-sponsoring from the American Academy of Family Physicians, the American Academy of Pediatrics, and the American Orthopaedic Society for Sports Medicine to form the Joint Review Committee-Athletic Training (JRC-AT) (Delforge & Behnke, 1999; Arnheim & Prentice, 2000). The JRC-AT's main assignment was to develop a set of standards and guidelines to govern the review process and accreditation of entry-level athletic training education programs. The *Competencies in Athletic Training* continued to be used as an accompanying document to assist in the direction of the accreditation process. The AMA approved the document, *Essentials and Guidelines for an Accredited Educational Program for the Athletic Trainer* (Essentials

and Guidelines for an Accredited Educational Program for the Athletic Trainer, 1991). This document acted as a guide for programs to follow in which minimum standards of quality used in accredited educational programs prepare individuals to enter the athletic training profession.

The involvement of the CAHEA and the JRC-AT became the marking of a new era in the history of athletic training education. The NATA Profession Education Committee was no longer of use since the induction of the new accrediting organizations and was discontinued in 1993 as the approval committee for athletic training education programs (Arnheim & Prentice, 2000). The winter of 1994 highlights the period of the accreditation of the first two entry-level athletic training education programs. Barry University and High Point University were recognized as institutions offering accredited entry-level athletic training education programs ("JRC-AT update," 1994). Shortly after this, the CAHEA was changed to become the Commission on Accreditation of Allied Health Education Programs (CAAHEP), the current accrediting agency for entry-level undergraduate education programs (Arnheim & Prentice, 2000).

The document *Essentials and Guidelines for an Accredited Educational Program for the Athletic Trainer* was revised in 1999 by CAAHEP and was renamed the *Standards and Guidelines for an Accredited Educational Program for the Athletic Trainer* (CAAHEP, 2001). In addition, *Athletic Training Educational Competencies* was written in 1999 by the NATA as a supplemental guide intended to assist educational program directors, allied health practitioners, administrators, instructional personnel, and students in identifying the knowledge and skills to be mastered within an entry-level athletic training educational program. This manual represents the minimum core content of the

educational process. Individual institutions are encouraged to build on these competencies and structure them to suit their individual needs (Athletic Training Educational Competencies, 1999).

A review of the literature indicated that the evolution of athletic training has included many changes perceived of as positive developments from its inception in the beginning of the century (Arnheim & Prentice, 2000; Grace, 1999). The induction of the NATA, the first certification examination, the formation of the NATABOC, and the accreditation process through CAAHEP have all served as milestones in the athletic training profession. Each of these milestones has greatly improved the profession in terms of development and recognition as an allied health profession. The accreditation process alone has been found to improve academic status and recognition (Poindexter, 1995), but it has yet to be proven as a means of increasing success rates on the NATABOC examination. Additional research is needed to identify salient issues in athletic training education that may contribute to better success of athletic training program graduates.

Instruction

Several studies have been done that attempt to identify what components of the educational programs are significant to the success of the athletic training student. Starkey (1997) proposed the need to identify those effective characteristics of quality athletic training clinical instruction. In 1995, Gardner developed a clinical instruction analysis tool in athletic training (CIAT-AT) to identify interaction behavior between clinical instructors, student athletic trainers, and athletes. It was concluded from his research that clinical instruction was more direct than indirect. Praise, acceptance, and

questioning consisted of behaviors from teachers' contributions to clinical instruction that were deemed important. Likewise, Moul (1997) also discussed the qualities of effective clinical instruction. Effective qualities were availability, approachability, accessibility, ability to structure learning environment, ability to promote direction, and employment of techniques that teach reflective practice. In addition, Vanic (1998) identified clinical instructor characteristics during the athletic training field experience through the clinical instructor survey tool (CIST) including professional competence, involvement/receptivity, instructional practices, and evaluation practices were characteristics identified. The literature supports the importance of identifying qualities of instruction in the clinical experience of the athletic training student, but no research has examined the didactic experience of the athletic training curriculum to identify criteria for effective preparation.

The quality of instruction of the clinical experience has been identified by the literature as a necessary component of the educational process. Curtis (1998) identified and described student athletic trainer perceptions of clinical experiences and found that students perceive mentoring, acceptance, nurturing, and modeling as critical behaviors demonstrated by their instructors. Thompson and Ryan (1996) found that the main influences on students' perceptions of clinical instruction were the therapist, environment, client, and time of day. Werner and Rink (1989) suggested that the teacher's ability to give students quality practice opportunities increased the effectiveness of instruction while Stemmans (1998) identified the skill of feedback from all clinical experiences and their instructors as necessary to the students. The results from Weidner (1997) showed that instructors are responsible for initiating educational opportunities for

their students in the clinical setting. In addition, Weidner (1997) found that the research base of athletic training clinical education is not definitive and that the nature of many clinical education models may not prepare every student with structured educational opportunities. These examples in the literature express what the students deem as important in athletic training programs and also support the influence of the clinical experience in the education of athletic training students. While the literature highlights many main points in the clinical aspect of the education process supporting Dewey's notion of experiential learning, it failed to recognize specific qualities and characteristics of the didactic and clinical experience that make an individual curriculum excel. Qualities such as detailed information pertaining to the clinical experience of the education programs, specific courses offered in the curriculum and content of curriculum courses have not been addressed in the literature.

Curriculum Assessment

Program assessment in the education of health professions has become an effective means to evaluate quality and effectiveness of educational programs (Boucher, 1999). Quality ranking of educational programs has historically been a controversial issue. Although the practice has positive and negative factors, quality ranking of institutions and curricula remains popular. Webster (1981) found that quality ranking refers to the academic quality of a department. This includes reputation of the institution, faculty awards and honors, citations, student achievement in later life, scores on standardized tests, and institutional academic resources. According to Webster (1981), quality rankings have been based on how students learn and therefore should be multidimensional. Jones, Lindsey, and Coggshell (1982) reported that areas of interest in

quality ranking include quality of faculty, effectiveness of the program, program size, characteristics of future graduates, size of the university library, research support, and journal articles attributed to the university program. Clark (1996) ranked the top twenty CAAHEP athletic training programs based on curriculum, student, faculty, and staff qualities.

Other allied health professions have assessed individual curricula as a means to evaluate the quality and effectiveness of their respective educational programs. Programs in physical therapy have assessed the progression of specific clinical decision making skills learned throughout the curriculum (Cigelman, 1996). Research skills were identified as a less important quality of a curriculum while skills related to knowledge, thinking, personal attributes, and practical application of skills were among those denoted as important for new graduates of allied health professions (Harris, Adamson, & Hunt, 1998). Additionally, a curriculum assessment study in speech pathology found that the curriculum addresses the development of skills and workplace behaviors necessary to achieve in the workforce (Harris, Adamson, Reed, & Hunt, 1998). Program assessment involves the examination of various variables to properly identify program effectiveness. Boucher (1999) evaluated a physical therapy curriculum using 11 component criteria for program assessment. The curriculum components were classified into three main areas consisting of program content, management, and resources. Specific curriculum components assessed include adjunct and support faculty, clinical education faculty, core faculty, mission and philosophy of the institution, program policies, resources, admissions criteria, clinical education program, curriculum, institutional policies, and performance of students. The findings were consistent with the hypotheses in that all

eleven components were viewed as important to the effectiveness of the physical therapy education program.

The controversy of ranking education programs through curriculum assessment and program evaluation has continued. The quality of an education program can sometimes be overshadowed by the institution's prestigious reputation, and the process itself can be very subjective in nature (Voll, Goodwin, & Pitney, 1999). Although the efficacy of quality assessment of curricula has been questioned they nevertheless prevail to offer beneficial information to students, faculty, and administration. Curriculum assessment provides continuous summative information in general practice and leads to positive feedback for improving performance in a medical curriculum (Hannay, Howe, & Miller, 1999). In addition, ranking programs can ensure that students can select a program that suits their individual learning needs. Considering the competitive job market in athletic training, students can make informed decisions with respect to which school they would like to attend based on personal learning objectives and increased employment upon graduation (Voll et al., 1999). Although quality ranking has been demonstrated as useful in determining which aspects of a program are regarded as the "best", the literature failed to identify specific attributes of a curriculum that make it exemplary compared to others. Attributes of a curriculum that relate specifically to clinical education, course instruction, and program intensity of the curriculum need to be addressed.

Curriculum Characteristics Leading to Academic Success

An important issue in athletic training education is the success rates on the National Athletic Trainers' Association Board of Certification Examination. Successful

academic outcomes in athletic training can be defined as passing the certification examination, the rate of graduation, and employability upon graduation (Peer & Rakich, 2000). Several studies have looked at possible attributes that contribute to students passing the certification examination and other measures of academic success in athletic training. Draper (1989) focused on learning style of the students as it relates to success on the examination and found that GPA, clinical experience, and number of contact hours accumulated within the clinical experiences predicted examination success. Harrelson, Gallaspy, Knight, and Leaver-Dunn (1997) concluded that academic variables such as overall GPA, ACT composite, GPA within the athletic training curriculum, and semesters of enrollment as strong predictors of success on the examination. The grade point average of student-athletic trainers was also found to be a significant predictor of success on the NATABOC certification examination (Middlemas, Manning, Gazzillo, & Young, 2001).

Williams and Hadfield (1999) found that incorporating the domains of athletic training, providing a variety of clinical experiences, and the number of faculty with terminal degrees significantly affects the passing rate of first-time examinees. In addition Draper (1987) indicated that the clinical experience plays an integral role in assisting students in passing the certification examination and feeling qualified to obtain an entry-level position upon graduation. The importance of the clinical portion of the athletic training curriculum has been viewed as a valid predictor of success on the certification examination (Erickson & Martin, 2000). Although the number of hours accumulated in the clinical education portion of the athletic training curriculum was not found to be predictive of scores on the NATABOC certification examination (Turocy, Comfort,

Perrin, & Gieck, 2000; Middlemas, Manning, Gazzillo, & Young, 2001), the quality of the clinical experience in terms of knowledge and skills obtained should be emphasized. Starkey (1988) suggested that programs that offer both didactic and clinical athletic training experiences attempt to blend the two for an increase in academic success. This type of curricular practice in athletic training is reflective of the work of Tyler (Tyler, 1949), but it remains uncertain as to the level of which this is accomplished in athletic training education.

Researchers have also examined the importance of a variety of clinical experiences in terms of the number of sports in which students are assigned within the athletic training curriculum (Erickson & Martin, 2000; Turocy et al., 2000). These studies did not find significant results as being contributors to success on the certification examination. Although the number of hours and a variety of clinical experiences has been shown in the literature not to be a contributory factor in academic success, the need for a quality hands-on clinical environment has been stressed (Erickson & Martin, 2000). In addition, the inclusion of a variety of environments in which different populations are utilized has been emphasized as an important aspect of the athletic training curriculum (Turocy et al., 2000).

As demonstrated by the literature, several studies looked at the clinical experience of the athletic training curriculum as it pertains to clinical instructor qualities and the perceptions of the students on the clinical experience. Studies also show what contributes to first-time success on the NATABOC examination and the importance of quality ranking programs. What the literature failed to express is the importance of the content of the curriculum, specifically the details of clinical experiences and didactic course

work, which make an exemplary curriculum beneficial to student success. In addition, the literature failed to identify a model of an exemplary athletic training curriculum that leads to improved success on the NATABOC certification examination.

According to the Joint Review Committee on Education Programs in Athletic Training (JRC-AT) and their document *Standards and Guidelines for the Athletic Trainer* (CAAHEP, 2001), guidelines have been set that serve as the minimum standards of quality used to accredit programs that prepare individuals to enter the athletic training profession. The standards that pertain to this study are discussed and also serve as the minimum guidelines used by all CAAHEP accredited programs. The standards that are of interest to this study are listed below and are cited from the *Standards and Guidelines for the Athletic Trainer* (CAAHEP, 2001). Table 1 summarizes the accreditation standards that are of interest to this study and categorizes them according to their relevance to this study.

1. A ratio of students to clinical instructors should foster substantial personal involvement with a maximum ratio of 8:1 recommended.

2. There shall be involvement of various medical and other health care personnel in formal or informal instruction. Their involvement on a planned and continuing basis is highly desirable. This includes involvement from dentists, nurses, physical therapists, occupational therapists, specialists in family practice, dermatology, ear nose and throat, orthopaedics, neurology, cardiology, pediatrics, internal medicine, opthalmology, physical medicine, and others. The athletic training education program is encouraged to expose the student to as many individual professionals and professions as possible. Involvement as a full-time or part-time classroom instructor, guest lecturer, or inservice provider is encouraged.

3. Athletic training competencies represent important standards for curriculum design, development of individual course content, and structuring of clinical experiences. These competencies should be achieved within the framework of appropriately sequenced basic science, clinical science, and athletic health care units, modules, and/or courses of

instruction, laboratory and/or clinical experiences. The *Role Delineation Study* also serves as a review of current practices in athletic training.

4. Curriculum content should include appropriate instructional emphasis on specified subject matter areas as reflected in the *NATA Athletic Training Educational Competencies* and the current *Role Delineation Study*. The incorporation of study in general education, multicultural diversity, liberal arts, and humanities studies to provide opportunities for later academic and career growth in encouraged. Such opportunities would include teacher education, advanced graduate education, entrepreneurial opportunities, and research. Students should receive formal instruction in the following expanded subject matter areas: assessment of injury/illness, exercise physiology, first aid and emergency care, general medical conditions and disabilities, health care administration, human anatomy, human physiology, kinesiology/biomechanics, medical ethics and legal issues, nutrition, pathology of injury/illness, pharmacology, professional development and responsibilities, psychosocial intervention and referral, risk management and injury/illness prevention, strength training and reconditioning, statistics and research design, therapeutic exercise and rehabilitative techniques, therapeutic modalities, weight management and body composition.

5. The athletic training curriculum shall include provision for clinical experiences under the direct supervision of a qualified clinical instructor.

6. Ample opportunity should be provided for the development and demonstration of competencies.

7. A minimum period of two academic years of clinical experience associated with course credit shall be obtained. An academic year consists of two semesters, three quarters, or three trimesters.

8. The clinical setting shall include the athletic training room(s), athletic practices and competitive events and should include exposure to upper extremity, lower extremity, equipment intensive, and general medical experiences of both genders.

9. Ample opportunity should be provided for supervised student coverage in both men's and women's sports including, but not limited to high risk activities such as football, wrestling, soccer, basketball, volleyball, gymnastics, lacrosse, hockey, and rugby.

10. Additional clinical settings may be utilized for portions of the clinical experience. Sponsoring institutions are also encouraged to utilize a variety of community-based health care facilities. These settings may include sports medicine clinics, physical therapy sites and/or rehabilitation

clinics, college or university health centers, hospital emergency rooms, physician's offices, or other appropriate health care facilities.

11. In order to broaden and supplement the clinical experiences, the sponsoring institution may establish formal affiliations with other institutions for provision of clinical experience setting. These may include athletic practices and competitions at secondary schools, colleges and universities, professional sports organizations, or other organizations involved in physical activity.

12. Supervised clinical experiences shall involve daily personal contact and supervision between the clinical instructor and the student in the same setting. Clinical instructors should be readily accessible to students for on-going instruction and guidance on a daily basis.

13. Programs shall routinely secure sufficient qualitative and quantitative information regarding program graduates to demonstrate on ongoing evaluation of programmatic outcomes. These may include surveys of graduates, surveys of employers, analysis of job performance, and performance on national and state certifying examinations.

Table 1
Summarization of Relevant CAAHEP Accreditation Standards

CAAHEP Standard	Category
Involvement of allied health personnel in instruction	Instruction
Athletic training competencies should be represented in the curriculum	Instruction
Incorporate athletic training competencies in the clinical experience	Instruction
Curriculum is to emphasize instruction of various subject matter relevant to athletic training	Instruction
Clinical experiences should be supervised	Instruction
Curriculum allows for development and demonstration of competencies	Clinical Ed
Clinical settings are to include athletic practices and competitive events	Clinical Ed
Additional clinical settings may be utilized for clinical experiences	Clinical Ed
Supplemental clinical experiences can include off-campus health sites	Clinical Ed
Program shall consist of two academic years in length	Intensity
8:1 ratio of students to clinical instructors	Intensity
Programs shall routinely evaluate programmatic outcomes	Assessment

Curriculum Models in Athletic Training

It has been demonstrated in the literature that athletic training education follows two distinct curriculum models that are similar to the work of John Dewey and Ralph W. Tyler. John Dewey argued that "education is a process of experiences and social activity" (Slattery, 1995, p. 147). Athletic training curricula do employ learning experiences in the form of clinical education. All students studying in an athletic training

curriculum, per CAAHEP accreditation standards, must be involved in a minimum of two academic years of structured clinical experiences (CAAHEP, 2001). Although the athletic training curricula provide learning experiences for its students in the form of clinical education and field experiences, it is possible that not all experiences utilized in the curriculum provide for optimal learning. Dewey warned that "not all experiences are necessarily positive educational events" (Slattery, 1995, p. 175). Therefore, it is possible that some curricula provide experiential learning in a manner that provides specific elements making it more productive and superior to others.

Another curriculum theory that serves as a foundation for the development of clinical education is based on the work of Ralph W. Tyler. Tyler's work in outcomes-based education and the importance of learning objectives in the planning of educational experiences has specific relevance to athletic training education. According to the *Standards and Guidelines for the Athletic Trainer* (CAAHEP, 2001), clinical education must include objective criteria for the successful completion of the clinical experience and curriculum as a whole. The companion document *Athletic Training Educational Competencies* (1999), contains specific educational objectives that must be met in the curriculum. As previously described, this document serves as the primary guide for the development of learning experiences and curriculum.

The use of the learning objectives in the athletic training curricula relate very closely to the first of Tyler's basic principles. Pinar, Reynolds, Slattery, and Taubman (1995) discuss the rationale of Tyler which includes first defining appropriate learning objectives, followed by the establishment of useful learning experiences, the proper organization of the learning experiences, and the evaluation of the curriculum with

respect to those aspects of the curriculum that did not prove to be effective. In a sense, athletic training programs follow Tyler's first principle with the establishment of learning objectives. Additionally, the second principle is also applied with the development of learning experiences in the form of clinical education.

Although Tyler's principles are being utilized in the education of future certified athletic trainers, it remains uncertain if Tyler's third and fourth principles are being followed. According to the application of both Dewey's and Tyler's theories of curriculum, it is apparent that both have relevance in the field of athletic training education. Though it appears that athletic training education subscribes more in the Deweyan philosophy, perhaps further application of Tyler's principles can be of additional benefit toward enhancing programmatic outcomes, namely the NATABOC examination.

Summary

A review of the literature has shown that the evolution of athletic training has made many positive changes throughout its history. The inception of the NATA, the initiation of the certification process, and the accreditation of education programs have all served as milestones for the athletic training profession. An issue that has received much of the recent attention is that of education reform. The reform movements have consisted of the elimination of the internship route to certification and an emphasis placed on increased educational outcomes. These reform issues have sparked an interest in the study of athletic training education and have led to several improvements in the field.

Although several improvements have been made in athletic training education, it has been established in the literature that a problem exists with the academic outcomes

and curriculum achievement in graduates of athletic training education programs. In this case, the academic outcomes that are of interest to the current study are the first-time passing rates of the NATABOC examination. Researchers have investigated the characteristics of quality clinical instruction, the assessment of athletic training curricula, and specific curriculum characteristics that may lead to better programmatic outcomes.

While there has been extensive research in an attempt to improve athletic training education, it is apparent that a problem exists with the current passing rates on the NATABOC examination. Several studies have investigated ways to improve examination success, but the literature has failed to identify a model of an exemplary curriculum in athletic training that leads to increased success on the NATABOC examination. This void in the literature supports the need for further investigation to identify specific elements of a curriculum that may lead to improved success on the NATABOC examination. Specific attributes of the athletic training curriculum that relate to clinical education, coursework and instruction, and curriculum intensity deserve further investigation.

Methodology

Introduction

The focus of this chapter is to explain the purpose of the research and discuss specific details of the study design and research methodology. This chapter is divided into various topics that clarify the current study as well as explicate the components of the research. The purpose and design of the study are first discussed, followed by discussions on the research questions and hypotheses, the limitations of the study, the study sample, materials, procedures, data collection, analysis of data, and concluded by a summary of the methodology.

Purpose of the Study

An important issue in athletic training education is the success rates on the National Athletic Trainers' Association Board of Certification (NATABOC) examination. The average first-time success rate on this national certification examination has been 31% over the last seven years. When examining the number of students who failed the NATABOC examination each year it was evident that students are not adequately prepared to pass the examination on the first attempt.

This study attempted to identify specific attributes from several entry-level athletic training curricula that contribute to success on the NATABOC certification examination. The need to determine what attributes make an exemplary curriculum is important to help students select a program that will suit their needs and prepare them for success in the future, as well as assist program directors with curriculum development. This study also attempted to identify characteristics of the athletic training curriculum that provided a more thorough educational experience for athletic training students, better

preparing them to achieve success on the NATABOC examination. Additionally, the goal of this study was to develop a model for an exemplary curriculum in entry-level undergraduate athletic training that can be used to assist in curriculum development of entry-level programs.

The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what constitutes an exemplary curriculum. The study was designed to identify attributes of the individual programs and success rates of graduates on the National Athletic Trainers Association Board of Certification Examination. In addition, the purpose of this study was to identify an exemplary curriculum in undergraduate, entry-level athletic training education and formulate a model from the research of an ideal curriculum for others to replicate.

Design of the Study

The research study was descriptive in design, and examined specific components of the athletic training curriculum at institutions accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) and compared them to the first-time passing rates of the selected institutions. The research questions and hypotheses that were formulated a priori were tested after the collection of data took place. The data were collected via a questionnaire from the curriculum directors at institutions of CAAHEP-accredited entry-level undergraduate athletic training programs. The survey was used to collect information on various curricular aspects of CAAHEP accredited programs, particularly elements of the curriculum that pertain to clinical education, instruction and coursework, and program intensity. The data were analyzed using inferential statistical methods to determine if there was a relationship between

specific components of the athletic training curriculum and high first-time passing rates on the NATABOC examination.

Research Questions

In light of the current difficulties that exist among first-time NATABOC examinees, several research questions were developed to identify potential predictors of success on the NATABOC examination. The development of the research questions was based on the findings of other research, as well as the formulation of curricular aspects that were hypothesized to be important elements of the athletic training curriculum. The research questions can be categorized into one of three main topic areas that were of interest for this study. The topic areas that were of interest for this study were clinical education, coursework and instruction, and program intensity.

Questions that related to clinical education were formulated to determine if there was a significant relationship between the clinical curriculum and higher passing rates on the NATABOC examination. Specific aspects of the clinical curriculum that were inquired about were the total number of clinical sites used for clinical education, the frequency of clinical education in days per week, and the number of practicum courses or laboratories used for the instruction of clinical skills. Furthermore, it was questioned if a relationship exists between the amount of clinical opportunities afforded to the students of a program and passing rates on the NATABOC examination.

Additional questions asked by the researcher pertained to coursework and instruction in the athletic training curriculum. The number of courses in which the athletic training competencies and clinical proficiencies were taught and evaluated was of interest to the researcher to see if these had any relationship to higher examination scores.

Other questions relating to coursework and instruction included if the supervision of athletic training students during clinical education has any relevance to examination success, as well as the number of athletic training-related courses provided by the curriculum. Program length in terms of the number of semesters or quarters was of interest as was the kinds of testing practices that take place in the curriculum and the number of courses that address the required 20 subject matter areas in athletic training.

Other inquiries by the researcher included specific curricular elements that pertain to program intensity. The research questions that related to this curricular area included the number of clinical rotations required by the curriculum and the duration of the clinical rotation in weeks. Likewise, it was questioned if the ratio of students to clinical instructors, the number of hours students accumulated during the clinical experience, and the requirement of educational inservice attendance were related to higher passing rates on the NATABOC examination. The specific questions posed for this research are as follows.

1. Is clinical education related to higher first-time success rates on the NATABOC examination?
2. Do CAAHEP accredited entry-level undergraduate athletic training education program's with a high rate of success on the NATABOC examination have a curriculum that consists of more course offerings than programs with low passing rates?
3. Do CAAHEP accredited entry-level undergraduate athletic training education program's with a high rate of success on the NATABOC

examination have more intense program requirements than programs with low passing rates?

4. Does the duration of the academic program affect first-time passing rates on the NATABOC examination?
5. Does the amount of laboratory/practicum courses required by the curriculum affect first-time passing rates on the NATABOC examination?
6. Is there a relationship between more athletic training related courses required in a curriculum and first-time passing rates on the NATABOC examination?
7. Do successful programs offer more courses to address the 20 required subject matter areas than less successful programs?
8. Are supplemental inservices/workshops related to better first-time success on the NATABOC examination?
9. Do the students of programs that use more courses to instruct and evaluate the athletic training competencies perform better on the NATABOC examination?
10. Is there a relationship between the number of clinical experience rotations required in a curriculum and first-time success on the NATABOC examination?
11. Does the length of the clinical experiences affect first-time passing rates on the NATABOC examination?
12. Does the frequency per week of clinical education experiences affect first-time passing rates on the NATABOC examination?

13. Do successful programs provide more clinical opportunities for their students than less successful programs?
14. Is the number of clinical sites used for clinical education related to first-time success on the NATABOC examination?
15. Is there a relationship between the amount of hours spent at each clinical experience and first-time success on the NATABOC examination?
16. Do programs that hold students accountable for the demonstration of skills during clinical education fare better on the NATABOC examination?
17. Do programs that incorporate testing methods similar to the NATABOC practical examination have higher first-time passing rates?
18. Does the utilization of allied health professionals, other than a certified athletic trainer, for instructional purposes affect first-time passing rates on the NATABOC examination?
19. Do programs that utilize more teaching styles for instruction experience higher first-time passing rates on the NATABOC examination?
20. Does the ratio of students to clinical instructors affect first-time success on the NATABOC examination?
21. Is the amount of supervision given to students related to first-time success on the NATABOC examination?
22. Do programs that have more faculty with only teaching responsibilities have higher first-time passing rates on the NATABOC examination?
23. Is a student's grade point average upon entry to the athletic training program related to first-time success on the NATABOC examination?

Research Hypotheses

In light of the research questions that were posed for this study, several hypotheses were formulated by the researcher about the existence of relationships between various curricular aspects in athletic training education and first-time success on the NATABOC examination. It was hypothesized that an exemplary curriculum in entry-level undergraduate athletic training education exhibits a thorough exposure to clinical experiences, provides a variety of athletic training coursework, and provides intense program requirements. This ideal curriculum will present with curricular attributes that better prepare students for passing the NATABOC certification examination on the first attempt. Referring to the previously established research questions, the following hypotheses for the current study are as follows.

1. Programs with a high first-time passing rate on the NATABOC examination provide a thorough experience in clinical education.
2. Programs with a high first-time passing rate on the NATABOC examination offer a curriculum that excels in course offerings and instruction.
3. Programs with a high first-time passing rate on the NATABOC examination have intense program requirements.
4. Programs that report high rates of first-time success on the NATABOC examination require more semesters/quarters in the academic core curriculum than programs with low passing rates.

5. Programs that maintain high rates of first-time success on the NATABOC examination require more practicum/laboratory courses in their curriculum than programs with low passing rates.
6. Programs that generate high rates of first-time success on the NATABOC examination offer more athletic training related courses in their curriculum than programs with low passing rates.
7. Programs that produce graduates with high rates of first-time success on the NATABOC examination offer more courses in their curriculum that address the CAAHEP 20 subject matter areas than programs with low passing rates.
8. Programs that exhibit high rates of first-time success on the NATABOC examination require supplemental inservice/workshop attendance compared to programs with low passing rates.
9. Programs that present with high rates of first-time success on the NATABOC examination instruct and evaluate the athletic training competencies in more courses than programs with low passing rates.
10. Programs that show high rates of first-time success on the NATABOC examination require more clinical experience rotations than programs with low passing rates.
11. Programs that experience high rates of first-time success on the NATABOC examination require a longer duration of each clinical experience in weeks than programs with low passing rates.

12. Programs that produce graduates with high rates of first-time success on the NATABOC examination require greater frequency of the clinical experience in days per week than programs with low passing rates.

13. Programs that maintain high rates of first-time success on the NATABOC examination provide more clinical opportunities than programs with low passing rates.

14. Programs that report high rates of first-time success on the NATABOC examination include more clinical sites for clinical education than programs with low passing rates.

15. Programs that display high rates of first-time success on the NATABOC examination require that more time be spent in hours at each clinical experience than programs with low passing rates.

16. Programs that exhibit high rates of first-time success on the NATABOC examination hold students accountable for the demonstration of skills than programs with low passing rates.

17. Programs that maintain high rates of first-time success on the NATABOC examination utilize testing procedures that mirror the practical portion of the NATABOC exam more than programs with low passing rates.

18. Programs that experience high rates of first-time success on the NATABOC examination utilize more allied health professionals for instruction than programs with low passing rates.

19. Programs that generate graduates with high rates of first-time success on the NATABOC examination utilize more teaching styles for instruction than programs with low passing rates.

20. Programs that show high rates of first-time success on the NATABOC examination have a lower ratio of students to clinical instructors than programs with low passing rates.

21. Programs that present with high rates of first-time success on the NATABOC examination supervise students more often during clinical and field experiences than programs with low passing rates.

22. Programs that exhibit high rates of first-time success on the NATABOC examination have more faculty with only teaching responsibilities than programs with low passing rates.

23. Programs that produce graduates with high rates of first-time success on the NATABOC examination require a higher grade point average for admission to the program than programs with low passing rates.

Limitations

There were some limitations of the study that might contribute to possible errors in the data collection process. For instance, the individuals responding to the survey may perceive the survey questions differently thus not responding in a manner that was intended by the questions on the survey. Turnover in academic programs might also contribute to errors in the responses in that newly appointed faculty might not have the familiarity of their new program that would be required to accurately respond to the survey items. Other limitations include the self-reporting nature of the survey and

relatively low return rate of responses characteristic of surveys. These limitations may lead to bias in the responses and also difficulty in the generalization of the study's results.

Additional limitations of the study also include the academic intelligence of the students taking the NATABOC examination. Students who have a higher grade point average and higher levels of academic ability may perform better on the NATABOC examination, thus affecting the results of the study. Some athletic training programs have minimum grade point average requirements for admission to the academic program. Programs with higher grade point average admission standards might be admitting students who have a higher level of academic intelligence, thus having higher passing rates on the NATABOC examination.

The limitations of the study relating to the survey questions have been accommodated by the tests of reliability and content validity of the survey instrument. The attempt to create a valid and reliable data collection tool has been viewed by the researcher as an acceptable method of reducing study limitations. Those limitations that cannot be accommodated for have been deemed as acceptable possibilities of error for the study.

Sample

At the time of data collection there were a total of 155 CAAHEP accredited entry-level undergraduate athletic training education programs in the United States. The sample for the current study consisted of the curriculum directors of all 155 CAAHEP entry-level undergraduate athletic training programs. It was necessary to include all current accredited programs in the sample to obtain a satisfactory number of responses. There was a 41% response rate (N=63) for this study.

The United States is divided into 10 districts within the National Athletic Trainers' Association (NATA). The sample for the study represented an adequate representation from all 10 districts with return rates ranging between 20% and 63% of all CAAHEP accredited programs from each district (see Table 2). The sample also represented a wide distribution of various institutional classifications by athletic participation, enrollment, and funding support (see Table 3).

Table 2
Sample Participation According to NATA District

District	Number of Participants	% of District Participation	% of Sample Participation
1	5	28%	7.81%
2	12	50%	18.75%
3	9	38%	14.06%
4	11	32%	17.19%
5	8	53%	12.50%
6	2	50%	3.13%
7	1	20%	1.56%
8	5	63%	7.81%
9	8	50%	12.50%
10	3	43%	4.69%

Table 3
Sample Descriptive Data

Descriptive Classification	Frequency (*N*)	Percent
Athletic Participation		
NCAA Division I	26	41.30%
NCAA Division II	16	25.40%
NCAA Division III	19	30.20%
NAIA	2	3.20%
Enrollment		
0 – 4999	25	39.70%
5000 – 9999	15	23.80%
10,000 – 14,999	8	12.70%
15,000 – 19,999	7	11.10%
20,000 – 24,999	4	6.30%
25,000 >	4	6.30%
Funding Support		
Public	35	55.60%
Private	28	44.40%

Materials

The survey instrument used in this study was developed by the researcher and was also based on a similar study by Williams (1998), (see Appendix A). There were no other existing survey instruments that were appropriate for this study. The survey was designed to collect specific information on various curricular aspects of CAAHEP accredited athletic training programs, namely those that pertain to clinical education, coursework and instruction, and program intensity. The data collected by the survey were used to determine if relationships exist between the curriculum characteristics assessed and first-time success on the NATABOC examination.

An introductory letter (see Appendix B) accompanied the questionnaire explaining the intent of the study and the contents of the questionnaire as well as a brief description of confidentiality assurance. The survey consisted of 24 items that were intended to gather responses specific to the areas of clinical education, coursework and instruction, and program intensity as the independent variables. The survey consisted of one item pertaining to first-time passing rate on the NATABOC examination as the dependent variable. The items on the survey were derived from the research questions as well as the specific formulated hypotheses.

Procedures

Prior to the collection of data, the questionnaire was distributed to a panel of athletic training program directors to assess the content validity and administration process of the survey instrument. The pilot study consisted of a panel of four program directors in athletic training from the following institutions: Kansas State University, Emporia State University, Fort Hayes State University, and Park University. Feedback

from the panel included recommendations on the time needed to complete the survey, survey content, structure, and item clarity. All input from the pilot study expert panel were implemented before the final draft of the survey was distributed to the sample. Most of the suggestions provided by the panel consisted of the rewording of survey questions for increased item clarity. The panel determined the survey instrument to be a valid tool for the purposes of this study. The length of time for completion of the survey, as well as the clarity and effectiveness of the administration of the survey instrument, were also deemed appropriate. A copy of the questions directed toward the pilot sample can be found in Appendix C.

Approval for the protection of human subjects was sought prior to the distribution of the survey instrument. The study population was informed in writing about the assurance of confidentiality and the protection of the information provided on the survey. Exemption was allowed for the informed consent of subjects, and approval was granted by the Local Review Board at DePaul University for the collection of data (see Appendix D).

The curriculum directors of all 155 CAAHEP accredited undergraduate entry-level athletic training program were mailed a survey packet to assess specific components of their athletic training curriculum. The names of the curriculum directors and addresses of the institutions were obtained from the CAAHEP directory of accredited athletic training education programs. The packet included a cover letter (Appendix B), the survey instrument (Appendix A), and a self-addressed stamped envelope for the return of the completed survey. A total of 41% of the sample ($N = 63$) responded to the survey

inquiry and were included as participants in the study. Solicitations for the return of the survey were performed only once.

Measures and Data Collection

The dependent variable for this study was the first-time pass rate on the NATABOC certification examination for the selected institutions. Per CAAHEP accreditation standards, programs are required to maintain data pertaining to programmatic first-time passing rates on the NATABOC certification examination. For this study, only the passing rates for graduates of the 2000-2001 academic year were obtained.

The following independent variables were used in this study to predict better examination success: 1) program length (semesters/quarters), 2) number of laboratories/practicum courses offered, 3) total number of courses in the core curriculum, 4) number of courses that address the 20 subject matter areas per CAAHEP accreditation guidelines, 5) requirement of supplemental inservice / workshop attendance, 6) number of courses in which athletic training competencies are taught and evaluated, 7) total number of clinical experience rotations, 8) average duration of the clinical experience in weeks, 9) frequency of the clinical experience in days per week, 10) clinical opportunities, 11) total number of clinical sites used for educational purposes, 12) number of hours required for the clinical experiences, 13) accountability of skill demonstration, 14) testing practices, 15) use of allied health professionals for instruction, 16) number of teaching styles utilized for instruction, 17) ratio of students to clinical instructors, 18) student supervision during the clinical experience, and 19) number of faculty with only teaching responsibilities.

Data Analysis

The data were collected using a descriptive survey method and were quantified assessing the relationships between the curricular attributes of the program and measures of student success determined by the passing rate of first-time examinees on the NATABOC certification examination. Data were entered into a computer and labeled according to the type of curricular aspect it was measuring. Specific values were assigned to each variable for the data analysis. The data were analyzed using SPSS 10.0 statistical computer software (SPSS Inc. Headquarters, Chicago, Illinois).

The independent variables of the study were first analyzed via factor analysis. This exploratory multivariate technique was used to assess the dimensionality of the independent variables in an attempt to reduce the overlapping measures into smaller constructs or factors. The researcher determined that with the relatively high number of independent variables and a fairly small sample, it would be best to attempt to reduce them into a more manageable set of factor variables. Based on the categorization of the survey items, three common constructs identified a priori which included courses and instruction, clinical education, and program intensity. To test the significance that these common constructs hold together statistically, they were factor analyzed with a principal component analysis and a three factor extraction technique. The three factors were then rotated with Varimax rotation and tested for significance with the Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett's test of sphericity. Factor scores were calculated for each factor to use in further analyses. In addition, factor loadings were also produced to yield correlations among the independent variables.

A regression analysis was performed to determine which of the independent variables (curricular attributes) accounted for the most shared variance in the dependent variable (NATABOC examination first-time passing rate). In an effort to simplify the analysis, the three factor scores obtained from the factor analysis were used as the independent variables.

Nonparametric tests were performed to evaluate pairwise comparisons among two groups of the dependent variable. Mann-Whitney U tests were used to determine if there were significant differences between programs with high first-time NATABOC passing rates (81% - 100%) and programs with very low first-time passing rates (0% - 20%) with respect to each of the independent variables. The nonparametric tests were done to identify if differences exist in curricular attributes between successful programs and those that do not perform well on the NATABOC examination in an attempt to create a model for an exemplary curriculum. An alpha level of .05 was established for all statistical tests.

Summary

The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what makes an exemplary curriculum based on attributes of the individual programs and success rates of graduates on the National Athletic Trainers Association Board of Certification Examination. In addition, the purpose of this study was to identify an exemplary curriculum in undergraduate, entry-level athletic training education and formulate a model from the research of an ideal curriculum for others to replicate.

The data were collected via a survey instrument that was distributed to all 155 CAAHEP accredited entry-level undergraduate athletic training programs. A response rate of 41% ($N = 63$) was obtained. The data were analyzed using exploratory multivariate and nonparametric techniques. The data were first analyzed via principal component factor analysis with three factor Varimax rotation, yielding three identifiable curriculum factors; clinical education, coursework and instruction, and program intensity. Regression analyses were then performed on the factor scores of the three main factors to determine which of the curriculum factors accounted for the most variance in NATABOC examination passing rates. The analysis then followed by nonparametric testing using the Mann-Whitney U test to determine if there were significant differences between programs with high first-time NATABOC passing rates (81% - 100%) and programs with very low first-time passing rates (0% - 20%) with respect to each of the independent variables.

Results

Introduction

This chapter contains the results of the statistical analyses performed to answer the research questions developed for this study. This chapter also contains an analysis of each result as it pertains to the specific research hypotheses that were tested. This study attempted to answer 23 research questions by testing 23 different hypotheses, all relating to curricular attributes that may lead to better first-time success rates on the NATABOC examination. Tables are provided to assist in the interpretation of the statistical tests and will accompany the presentation of the findings for each research hypothesis. This chapter begins with the results and analysis of the factor analyses, followed by the results of the nonparametric analyses. The results and analysis of each of the research hypotheses are discussed consecutively.

Results of the Study

The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what makes an exemplary curriculum based on attributes of the individual programs and success rates on the National Athletic Trainers Association Board of Certification Examination. In addition, the purpose of this study is to identify an exemplary curriculum in undergraduate, entry-level athletic training education and formulate a model from the research of an ideal curriculum for others to follow. A significance level of .05 was established for all statistical tests. The results of the analyses regarding each research question and hypothesis are discussed below.

The dimensionality of the 18 independent variables was first analyzed using principal component factor analysis. Three criteria were used to determine the number of factors to rotate: 1) the absolute value of the initial eigenvalues, 2) the a priori hypothesis that the independent variables could be clustered into three smaller constructs, and 3) the interpretability of the factor solution. Overall, the results of the factor analysis were significant and the a priori theory that the independent variables for the study could be reduced to three common constructs, or factors was supported.

A common criteria for the extraction method of factors is to accept all factors that have eigenvalues greater than one. To support the researcher's a priori hypothesis that the independent variables could be reduced to a set of three common constructs or factors, all factors with eigenvalues greater than two were accepted. The results of the Varimax rotated factor analysis were significant for a three factor solution, as indicated by the Kaiser-Meyer-Olkin measure of sampling adequacy and the Bartlett's test of sphericity, χ^2 (153) = 188.31, p = .03 (Table 4).

Table 4
Factor analysis significance test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.30
Bartlett's Test of Spericity	Approx. Chi Square	188.31
	df	153
	Sig.	.03

The factor analysis output matrix yielded support for the use of the three solution factor analysis. The results of the rotated factor matrix can be found in Table 5. Three factors were identified as having eigenvalues greater than two, thus were utilized as the three factors for the study. The rotated factor solution yields three interpretable distinct

Table 5
Factor analysis table of rotated factors.

	Initial Eigenvalue Statistics		Extraction Sums of Squared Loadings Statistics		Rotation Sums of Squared Loadings Statistics	
Component	Total	Cumulative %	Total	Cumulative %	Total	Cumulative %
1	3.01	16.71	3.01	16.71	2.71	15.05
2	2.45	30.31	2.45	30.31	2.55	29.23
3	2.22	42.65	2.22	42.65	2.42	42.65
4	1.92	53.32				
5	1.50	61.66				
6	1.22	68.40				
7	1.13	74.68				
8	.96	80.01				
9	.89	84.97				
10	.64	88.51				
11	.59	91.76				
12	.48	94.44				
13	.35	96.40				
14	.24	97.75				
15	.16	98.64				
16	.12	99.31				
17	8.726E-02	99.79				
18	3.781E-02	100.00				

Extraction Method: Principal Component Analysis.

factors as shown in Table 6. The factor solution table depicts the factor loadings of each independent variable on the three factors. The three factors were analyzed in respect to the independent variables that loaded on each factor respectively. They were given a title that corresponded to the common theme from the independent variable that loaded upon

Table 6
Independent variable factor loadings.

	courses/ instruction	clinical education	program intensity
Courses in which competencies evaluated	.74		
Supervision of clinical/field experiences	-.66		
Allied health professionals	.66		
Total semesters	-.58		
Testing practices	.50		
Number of courses	.44		
Subject Matter	.42		
Total number of clinical sites		.79	
Days per week of clinical education		.73	
Total clinical opportunities		.58	
Total number of teaching styles		.51	
Number of practicum courses		-.50	
Number of faculty that only teach			
Number of clinical rotations			.74
Average weeks of clinical rotations			-.73
Student: Clinical Instructor ratio			.55
Clinical hours			-.48
Inservices			.45

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

them. Factor 1 was labeled *courses/instruction*, Factor 2; *clinical education*, and Factor 3; *program intensity*. Table 6 denotes the independent variables associated with each factor.

Factor 1, courses/instruction, consisted of seven independent variables that assessed specific curricular attributes related to these areas. The factor loadings for the course/instruction factor ranged from .42 to .74. These include 1) the number of courses in which the athletic training competencies were instructed and evaluated, 2) student supervision during the clinical and field experience, 3) use of allied health professionals

for instruction, 4) program length (semesters/quarters), 5) testing practices that mirror the practical portion of the NATABOC exam, 6) total number of courses in the core curriculum, and 7) number of courses that address the 20 subject matter areas per CAAHEP accreditation guidelines.

Factor 2, clinical education, consisted of five independent variables with factor loadings ranging from .50 to .79. These include 1) total number of clinical sites used for educational purposes, 2) frequency of the clinical experience in days per week, 3) total clinical opportunities, 4) number of teaching styles utilized for instruction, and 5) number of laboratories/practicum courses offered.

Factor 3, program intensity, consisted of five independent variables with factor loadings ranging from .45 to .74. These include 1) total number of clinical experience rotations, 2) average duration of the clinical experience in weeks, 3) ratio of students to clinical instructors, 4) number of hours required for the clinical experiences, and 5) requirement of supplemental inservice / workshop attendance.

The amount of variance explained by the three factors can be found in Table 5. Variables associated with the *courses/instruction* factor accounted for 15.05% of the variance of the independent variables, while *clinical education* and *program intensity* accounted for 14.18% and 13.42% respectively. The three factors combined accounted for 42.65% of the variable variance, indicating that almost one-half of the distribution variability lies within these three factors. This added support to the rationale of performing a three-factor rotation for the factor analysis, as well as supported the researcher's a priori hypothesis that the independent variables could be reduced or grouped into categories of three main factors. The significance of the factor analysis

allowed the researcher to reduce the quantity of independent variables into a more manageable number of factors for further analysis.

During the data screening process for the factor analysis, the independent variable *accountability of skill demonstration* correlated very poorly with all other independent variables and thus was excluded from the analysis. Additionally, the independent variable *number of faculty with only teaching responsibilities* did not receive any factor loadings during the rotation step of the analysis. This indicates that this particular variable does not correlate with any of the other independent variables and therefore cannot be included as a variable in one of the three common factors.

Although some of these factor loading correlations may appear low, Tabachnick and Fidell (1996) recommended interpreting factor loadings greater than .32. All factor loadings for the current study received correlations of .40 or greater and are thus interpreted as being variables that correlate well with one another. Table 7 is presented to summarize interpretations of factor loadings as well as demonstrate that the factor loadings of the current study ranged from fair to excellent, per the recommendations from Tabachnick and Fidell, (1996). Thus the factors identified a priori are supported by the collinearity of the variables within these three factors.

Hypotheses one through three were tested via a multiple regression analysis using the factor scores derived from the factor analysis. The remaining hypotheses were assessed through nonparametric analysis using the Mann-Whitney U test.
The results of the research are reported and analyzed consecutively by each hypothesis and are also summarized in Table 8.

Table 7
Factor loading interpretations.

Factor Loading	Quality
>.71	excellent
.63 - .70	very good
.45 - .62	fair
.32- .44	poor

Hypothesis 1

A multiple regression analysis was conducted to test the hypothesis that a thorough experience in clinical education is a predictor of high first-time passing rates on the NATABOC examination. The factor scores from the *clinical education* factor were used in this analysis. The predictors were the five independent variables related to clinical education, while the criterion variable was first-time passing rate on the NATABOC examination. The hypothesis was rejected as the results showed that the variables associated with clinical education were not significant predictors of first-time success on the NATABOC examination, $R^2 = .05$, $F(1, 22) = 1.03$, $p = .32$, (Table 9). The factors associated with clinical education used in this analysis accounted for only 5% of the variance in NATABOC first-time passing scores. These predictors of examination success were not found to make a significant contribution to the regression model, $B = 21$, $t = 1.01$, $p = .32$, (Table 9).

Table 8
Results of the Research Hypotheses

Hypothesis		Analysis	Outcome
1.	Programs with a high first-time passing rate on the NATABOC exam provide a thorough experience in clinical education.	Multiple Regression	Hypothesis Rejected
2.	Programs with a high first-time passing rate on the NATABOC exam offer a curriculum that excels in course offerings and instruction.	Multiple Regression	Hypothesis Rejected
3.	Programs with a high first-time passing rate on the NATABOC exam have intense program requirements.	Multiple Regression	Hypothesis Rejected
4.	Programs that report high rates of first-time success on the NATABOC exam require more semesters/quarters in the academic core curriculum than programs with low passing rates.	Mann-Whitney U Test	Hypothesis Rejected
5.	Programs that maintain high rates of first-time success on the NATABOC exam require more practicum/laboratory courses in their curriculum than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
6.	Programs that generate high rates of first-time success on the NATABOC exam offer more athletic training related courses in their curriculum than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
7.	Programs that produce graduates with high rates of first-time success on the NATABOC exam offer more courses in their curriculum that address the CAAHEP 20 subject matter areas than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
8.	Programs that exhibit high rates of first-time success on the NATABOC exam require supplemental inservice/workshop attendance compared to programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected

9.	Programs that present with high rates of first-time success on the NATABOC exam instruct and evaluate the athletic training competencies in more courses than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
10.	Programs that show high rates of first-time success on the NATABOC exam require more clinical experience rotations than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
11.	Programs that experience high rates of first-time success on the NATABOC exam require a longer duration of each clinical experience in weeks than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
12.	Programs that produce graduates with high rates of first-time success on the NATABOC exam require greater frequency of the clinical experience in days per week than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
13.	Programs that maintain high rates of first-time success on the NATABOC exam provide more clinical opportunities than programs with low passing rates.	Mann-Whitney U	Hypothesis Accepted
14.	Programs that report high rates of first-time success on the NATABOC exam include more clinical sites for clinical education than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
15.	Programs that display high rates of first-time success on the NATABOC exam require that more time be spent in hours at each clinical experience than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
16.	Programs that exhibit high rates of first-time success on the NATABOC examination hold students accountable for the demonstration of skills than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
17.	Programs that maintain high rates of first-time success on the NATABOC exam utilize testing procedures that mirror the practical portion of the NATABOC exam more than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected

18.	Programs that experience high rates of first-time success on the NATABOC exam utilize more allied health professionals for instruction than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
19.	Programs that generate graduates with high rates of first-time success on the NATABOC exam utilize more teaching styles for instruction than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
20.	Programs that show high rates of first-time success on the NATABOC exam have a lower ratio of students to clinical instructors than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
21.	Programs that present with high rates of first-time success on the NATABOC exam supervise students more often during clinical and field experiences than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
22.	Programs that exhibit high rates of first-time success on the NATABOC exam have more faculty with only teaching responsibilities than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected
23.	Programs that produce graduates with high rates of first-time success on the NATABOC exam require a higher grade point average for admission to the program than programs with low passing rates.	Mann-Whitney U	Hypothesis Rejected

Hypothesis 2

A multiple regression analysis was performed to test the hypothesis that curricula which excel in course offerings and instruction possess high first-time passing rates on the NATABOC examination. The factor scores from the *courses/instruction* factor were used in the analysis. The predictors were the seven independent variables that related to courses and instruction, while the criterion variable was first-time passing rate on the NATABOC examination. The hypothesis was rejected as the results showed that the

variables associated with courses and instruction were not significant predictors of first-time success on the NATABOC examination, $R^2 = .08$, $F(1, 22) = 0.17$, $p = .69$, (Table 10). The factors associated with clinical education used in this analysis accounted for only 8% of the variance in NATABOC first-time passing scores. These predictors of examination success were not found to make a significant contribution to the regression model, $B = -.09$, $t = -.41$, $p = .69$, (Table 10).

Hypothesis 3

A multiple regression analysis was performed to test the hypothesis that institutions with intense program requirements have high first-time passing rates on the NATABOC examination. The factor scores from the *program intensity* factor were used in the analysis. The predictors were the five independent variables that related to program intensity, while the criterion variable was first-time passing rate on the NATABOC examination. The hypothesis was rejected as the results showed that the variables associated with program intensity were not significant predictors of first-time success on the NATABOC examination, $R^2 = .08$, $F(1, 22) = 1.90$, $p = .18$, (Table 11). The factors associated with clinical education used in this analysis accounted for only 8% of the variance in NATABOC first-time passing scores. These predictors of examination success were not found to make a significant contribution to the regression model, $B = .28$, $t = 1.38$, $p = .18$, (Table 11).

Table 9
Multiple Regression Analysis: Clinical Education Factor Scores as Predictors of First-Time NATABOC Examination Success

		Model
		Clinical Education
R		.21[a]
R^2		.05
Adjusted R^2		.001
Std. Error of the Estimate		1.38
Change Statistics	R^2 Change	.045
	F Change	1.03
	df1	1
	df2	22
	Sig. F Change	.32
Standardized Coefficients	*B*	.21
	t	1.01
	p	.32
	partial	.21
	part	.21

a. Predictors: (constant) clinical education factor scores

Table 10
Multiple Regression Analysis: Course/Instruction Factor Scores as Predictors of First-Time NATABOC Examination Success

		Model
		Course / Instruction
R		.09 [a]
R^2		.08
Adjusted R^2		-.04
Std. Error of the Estimate		1.41
Change Statistics	R^2 Change	.007
	F Change	.17
	df1	1
	df2	22
	Sig. F Change	.69
Standardized Coefficients	*B*	-.09
	t	-.41
	p	.69
	partial	-.09
	part	-.09

a. Predictors: (constant) course/instruction factor scores

Table 11
Multiple Regression Analysis: Program Intensity Factor Scores as Predictors of First-Time NATABOC Examination Success

		Model
		Program Intensity
R		.28 [a]
R^2		.08
Adjusted R^2		.04
Std. Error of the Estimate		1.36
Change Statistics	R^2 Change	.08
	F Change	1.90
	df1	1
	df2	22
	Sig. F Change	.18
Standardized Coefficients	B	.28
	t	1.38
	p	.18
	partial	.28
	part	.28

a. Predictors: (constant) program intensity factor scores

Hypothesis 4

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require more semesters/quarters in the academic core curriculum than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.05$, $p = .96$. Programs with passing rates between 81% and 100% had a mean rank of 11.03, while programs with passing rates between 0% and 20% had a mean rank of 10.88. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that the number of semesters/quarters required in the academic core curriculum does not affect first-time passing rates on the NATABOC examination (see Table 12). Means and standard deviations for all independent variables can be found in Table 13.

Hypothesis 5

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require more practicum/laboratory courses in the academic curriculum than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -1.72$, $p = .09$. Programs with passing rates between 81% and 100% had a mean rank of 12.61, while programs with passing rates between 0% and 20% had a mean rank of 6.50. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that the number of practicum/laboratory courses required in the academic core curriculum is not a contributor to first-time passing rates on the NATABOC examination (see Table 12).

Table 12

Differences Between Programs with High Passing Rates Versus Programs with Low Passing Rates According to Various Curricular Attributes

Independent Variable	Group 1 Passing Rate (0% - 20%) Mean Rank	Group 2 Passing Rate (81% - 100%) Mean Rank	Mann-Whitney *U*	*Z*	*p*
Semesters/quarters	10.88	11.03	33.50	-0.05	.96
Practicum/lab courses	6.50	12.61	16.00	-1.72	.09
Athletic training courses	5.67	11.89	11.00	-1.62	.11
Courses that address 20 subject matter areas	8.67	10.25	20.00	-0.45	.65
Inservices attendance	6.67	10.07	14.00	-1.16	.25
Courses in which competencies evaluated	11.50	10.32	22.50	-0.33	.75
Clinical experience rotations	7.75	12.33	21.00	-1.31	.19
Weeks of clinical experiences	12.00	9.63	18.00	-0.68	.50
Days per week of clinical education	13.00	10.53	26.00	-0.73	.47
Clinical opportunities	9.25	12.00	27.00	-2.12	.03*
Clinical sites	10.63	11.69	32.50	-0.31	.76
Clinical hours	8.50	11.00	24.00	-0.81	.42
Accountability of skill demonstration	11.50	11.50	36.00	0.00	1.00
Testing practices mirror NATABOC practical	13.13	11.14	29.50	-0.59	.55
Allied health professionals	12.00	9.63	18.00	-0.82	.41
Teaching styles	10.88	11.03	33.50	-0.05	.96
Student: Clinical Instructor ratio	10.88	11.03	33.50	-0.05	.96
Supervision	12.00	11.39	34.00	-0.47	.64
Faculty that only teach	8.38	12.19	23.50	-1.13	.26
Grade point average admission requirement	10.63	11.09	32.50	-0.14	.89

* Significant at $p < .05$

Table 13
Means and Standard Deviations of the Independent Variables

Independent Variable	*N*	*M*	*SD*	*Min*	*Max*
Total semesters	59	6.20	1.37	4.00	8.00
Practicum/laboratories	63	7.68	5.16	1.00	38.00
Number of courses	62	19.56	8.46	5.00	56.00
Subject matter	53	15.66	8.61	1.00	32.00
Inservices	54	1.91	0.68	0.00	3.00
Courses addressing competencies	57	7.16	7.45	2.00	32.00
Clinical rotations	61	7.09	2.89	3.00	18.00
Total clinical sites	63	6.82	2.43	1.00	14.00
Clinincal experience in weeks	57	12.99	3.26	3.00	20.00
Average days of clinical education	57	4.91	1.02	2.00	7.00
Clinical opportunities [a]	63	3.97	0.18	3.00	4.00
Clinical hours per clinical exp. [b]	57	4.75	1.44	1.00	6.00
Accountable for learning [c]	63	1.06	0.24	1.00	2.00
Testing mirrors NATABOC [d]	63	1.83	0.66	0.00	3.00
Allied health professionals [e]	58	1.91	0.71	1.00	3.00
Total teaching styles	62	11.77	2.23	1.00	15.00
Student-Clinical Instructor ratio [f]	59	5.41	1.89	2.00	9.00
Supervision [g]	62	3.87	0.59	1.00	4.00
Faculty that only teach	63	1.44	1.54	0.00	6.00
Admission GPA	60	2.54	0.27	2.00	3.00

Note. Mean values for the indicated variables are expressed in terms of their statistical coding. Interpretations for these are provided. [a] Clinical opportunities included team, individual, and both gender sport experiences. [b] Mean clinical hours per experience ranged between 100 and 200. [c] Students were held accountable for demonstration of skills. [d] Programs mirror NATABOC testing practices frequently and occasionally.

[e] Allied health professionals utilized monthly for instruction. [f] Mean ratio was 5.41:1.

[g] *Students supervised continuously.*

Hypothesis 6

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require more athletic training related courses in their curriculum than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -1.62, p = .12$. Programs with passing rates between 81% and 100% had a mean rank of 11.89, while programs with passing rates between 0% and 20% had a mean rank of 5.67. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that the number of athletic training related courses required in the academic core curriculum does not affect first-time passing rates on the NATABOC examination (see Table12).

Hypothesis 7

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) offer more courses that address the CAAHEP 20 subject matter areas than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.45, p = .65$. Programs with passing rates between 81% and 100% had a mean rank of 10.25, while programs with passing rates between 0% and 20% had a mean rank of 8.67. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the number of courses offered to address the CAAHEP 20

subject matter areas does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 8

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require supplemental inservice/workship attendance compared to programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -1.16, p = .25$. Programs with passing rates between 81% and 100% had a mean rank of 10.07, while programs with passing rates between 0% and 20% had a mean rank of 6.67. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the requirement of inservice/workshop attendance does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 9

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100) instruct and evaluate the athletic training competencies in more courses than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.33, p = .75$. Programs with passing rates between 81% and 100% had a mean rank of 10.32, while programs with passing rates between 0% and 20% had a mean rank of 11.50. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that the number of courses that instruct and evaluate the athletic training competencies does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 10

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require more clinical experience rotations than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -1.31$, $p = .19$. Programs with passing rates between 81% and 100% had a mean rank of 12.33, while programs with passing rates between 0% and 20% had a mean rank of 7.75. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the number of clinical experience rotations required in a curriculum does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 11

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require a longer duration of each clinical experience in weeks than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.68$, $p = .50$. Programs with passing rates between 81% and 100% had a mean rank of 9.63, while programs with passing rates between 0% and 20% had a mean rank of 12.00. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that the duration of each clinical experience in weeks does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 12

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require

greater frequency of the clinical experience in days per week than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.73$, $p = .47$. Programs with passing rates between 81% and 100% had a mean rank of10.53, while programs with passing rates between 0% and 20% had a mean rank of 13.00. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the number of days per week spent in clinical education does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 13

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) provide more clinical opportunities in their curriculum than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was significant, $z = -2.12$, $p = .03$. Programs with passing rates between 81% and 100% had a mean rank of 12.00, while programs with passing rates between 0% and 20% had a mean rank of 9.25. The hypothesis was accepted as this analysis was significant at the $p \leq .05$ level indicating that the number of clinical opportunities provided does affect first-time passing rates on the NATABOC examination (see Table 12). According to the results of this analysis, programs that provide more clinical opportunities for its students during the curriculum initially perform better on the NATABOC examination.

Hypothesis 14

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) include more clinical sites for clinical education than programs with low first-time passing rates (0% -

20%). The result of the Mann-Whitney U test was not significant, $z = -0.31, p = .76$. Programs with passing rates between 81% and 100% had a mean rank of 11.69, while programs with passing rates between 0% and 20% had a mean rank of 10.63. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the inclusion of more clinical sites for clinical education does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 15

A Mann-Whitney U test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require that more time be spent in hours at each clinical experience than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney U test was not significant, $z = -0.81, p = .42$. Programs with passing rates between 81% and 100% had a mean rank of 11.00, while programs with passing rates between 0% and 20% had a mean rank of 8.50. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the number of hours spent at each clinical experience does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 16

A Mann-Whitney U test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) hold students accountable for the demonstration of skills than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney U test was significant, $z = 0.00, p = 1.00$. Programs with passing rates between 81% and 100% had a mean rank of 11.50, while programs with passing rates between 0% and 20% had a mean rank

of 11.50. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that there is no difference in the accountability of skill demonstration between programs with high passing rates on the NATABOC examination and programs with low passing rates (see Table 12).

Hypothesis 17

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) utilize testing procedures that mirror the practical portion of the NATABOC exam more than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.59$, $p = .55$. Programs with passing rates between 81% and 100% had a mean rank of 11.14, while programs with passing rates between 0% and 20% had a mean rank of 13.13. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the utilization of testing procedures that mirror the practical portion of the NATABOC examination does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 18

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) utilize more allied health professionals for instruction than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.82$, $p = .41$. Programs with passing rates between 81% and 100% had a mean rank of 9.63, while programs with passing rates between 0% and 20% had a mean rank of 12.00. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating

the utilization of numerous allied health professionals for instruction does not lead to better initial success on the NATABOC examination (see Table 12).

Hypothesis 19

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) utilize more teaching styles for instruction than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.05$, $p = .96$. Programs with passing rates between 81% and 100% had a mean rank of 11.03, while programs with passing rates between 0% and 20% had a mean rank of 10.88. This analysis was not significant at the $p \leq .05$ level thus rejecting the hypothesis and indicating that a lower ratio of students to clinical instructors does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 20

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) have a lower ratio of students to clinical instructors than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.05$, $p = .96$. Programs with passing rates between 81% and 100% had a mean rank of 11.03, while programs with passing rates between 0% and 20% had a mean rank of 10.88. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that the number of clinical experience rotations required in a curriculum does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 21

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) supervise students more often during clinical and field experiences than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.47$, $p = .64$. Programs with passing rates between 81% and 100% had a mean rank of 11.39, while programs with passing rates between 0% and 20% had a mean rank of 12.00. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that more frequent supervision of students during the clinical and field experience does not affect first-time passing rates on the NATABOC examination (see Table 12).

Hypothesis 22

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) have more faculty with only teaching responsibilities than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -1.13$, $p = .26$. Programs with passing rates between 81% and 100% had a mean rank of 12.19, while programs with passing rates between 0% and 20% had a mean rank of 8.38. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that programs that have more faculty with only academic responsibilities do not perform better on the NATABOC examination on the first attempt (see Table 12). This variable was also not found to be correlated with any of the other independent variables and did

not load on any of the three factors during the factor analysis. Therefore it was not included in the multiple regression analysis but was analyzed independently.

Hypothesis 23

A Mann-Whitney *U* test was performed to test the hypothesis that programs with high first-time passing rates on the NATABOC examination (81% - 100%) require a higher grade point average for admission to the athletic training program major than programs with low first-time passing rates (0% - 20%). The result of the Mann-Whitney *U* test was not significant, $z = -0.14$, $p = .89$. Programs with passing rates between 81% and 100% had a mean rank of 11.09, while programs with passing rates between 0% and 20% had a mean rank of 10.63. The hypothesis was rejected as this analysis was not significant at the $p \leq .05$ level indicating that programs with higher grade point average admission standards do not experience higher passing rates on the NATABOC examination (see Table 12).

Summary

The purpose of this research was to identify specific curricular attributes that may lead to better first-time success on the NATABOC examination. It was hypothesized that an exemplary curriculum in entry-level undergraduate athletic training exhibits a thorough exposure to clinical experiences, provides a variety of course work and instruction practices, as well as provides a program with intense programmatic requirements. Independent variables were grouped together via factor analysis, and labeled according to the commonality of independent variable factor loadings on each of the three variables (courses/instruction, clinical education, and program intensity).

The results of the multiple regression analysis using factor scores from the three factors were not significant. The independent variables, when assessed together as a group of factor scores, were not found to be positively related to the dependent variable. This indicated that specific curricular attributes relating to course work and instruction, clinical education, and program intensity do not assist programs in producing graduates that achieve first-time success in passing the NATABOC examination.

In addition, nonparametric analyses were performed to identify if significant differences exist between programs that maintain a high level of first-time pass rate success on the NATABOC exam (81% - 100%) and those with low passing rates (0% - 20%) with respect to a variety of curricular attributes. The results of the Mann-Whitney *U* tests were not significant, indicating that the following curricular attributes do not assist programs in achieving initial success on the NATABOC examination: 1) length of a program in semesters/quarters, 2) the number of practicum/laboratory courses, 3) number of athletic training-related courses, 4) number of courses that address the 20 required subject matter area, 5) requirement of supplemental inservices/workshops, 6) number of courses that instruct and evaluate the athletic training competencies, 7) number of clinical experience rotations, 8) duration of clinical experiences in weeks, 9) frequency in days per week of clinical education, 10) number of clinical sites, 11) number of hours spent at each clinical experience, 12) accountability of skill demonstration, 13) testing practices that mirror the NATABOC practical portion of the exam, 14) use of allied health professionals for instruction, 15) utilization of more teaching styles, 16) student to clinical instructor ratio, 17) frequency of supervision, 18) faculty with only teaching responsibilities, 19) program admission grade point average.

The study found only one curriculum variable to be significantly related to higher initial passing rates on the NATABOC exam. The number of clinical opportunities provided by a program was found to be significantly related to higher initial passing rates on the NATABOC exam.

Discussion

Introduction

This chapter presents the conclusions of the study with respect to the research questions and formulated hypotheses. The conclusions that relate to the purpose of the study and hypotheses, the implications and recommendations of the findings, and the limitations of the study will be discussed, followed by suggestions for further research. The conclusions are discussed in a manner that addresses the main hypotheses of 1) clinical experiences, 2) courses and instruction, and 3) program intensity as they related to initial success on the NATABOC examination. The nonparametric analyses of the single independent variables as they relate to initial success on the NATABOC examination are included in the discussions of the three main hypotheses.

Discussion of Results

The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what makes an exemplary curriculum based on attributes of the individual programs and success rates of graduates on the National Athletic Trainers Association Board of Certification Examination. In addition, the purpose of this study was to identify an exemplary curriculum in undergraduate, entry-level athletic training education and formulate a model from the research of an ideal curriculum for others to replicate. Several curricular attributes were analyzed for their relationship to first-time passing rates on the NATABOC exam, both as independent comparisons and as composite factors.

The results of the study found that there is no significant relationship between programs that maintain high passing rates on the NATABOC exam and the provision of a

thorough clinical education experience. The curricular attributes that were viewed as important aspects of the clinical education experience were included as variables in this analysis. These include: 1) the total number of clinical sites used for clinical education, 2) the frequency of clinical education in days per week, 3) the number of clinical opportunities provided for students during the clinical aspect of the curriculum, 4) the number of teaching styles used for instructing the athletic training competencies, and 5) the number of practicum courses or laboratories required in a curriculum. This composite of five curricular attributes were viewed by the researcher as important aspects of a clinical curriculum, and although commonly implemented by all programs to some extent, do not appear to have any relevance to the contribution of achievement on the NATABOC examination.

These results were in direct conflict with other findings in the literature. Erickson and Martin (2000) found that a quality clinical experience may be a predictor of NATABOC examination success, but also found the exposure to a variety of clinical sites not to be a valid predictor of success. The results of the current study are also not consistent with the findings of Erickson and Martin (2000) in that the clinical experience as a whole and a variety of clinical sites were not found to be predictors of success on the NATABOC examination. This was the case with the analyses of both variables as an independent comparison with passing rates on the NATABOC exam as well as when grouped as a composite of factor scores.

When comparing the results of the current study to the literature, the findings seems to be contradictory. It would appear as though the clinical aspect of the curriculum would be a key factor in the development of student learning and serve as a meaningful

and useful component of the curriculum. But as Dewey suggested, not all experiences may elicit positive educational benefits (Slattery, 1995). Although the results of this study were not favorable toward clinical education being a contributor to initial success on the NATABOC examination, perhaps there are other variables involved in the clinical education curriculum that were not analyzed by this study that can elicit positive benefits.

Researchers have looked at the quality of the clinical experience, specifically pertaining to the quality of the clinical instructor and the quality of the learning environment as well. Miller and Berry (2002) found that only 7% of athletic training students' clinical placement time was actually spent in instructional activities with their clinical instructor. Perhaps the mere fact that students are not receiving adequate instruction is one of the main reasons for doing poorly on the NATABOC examination.

Additionally, Miller and Berry (2002) found that advanced students spend more time engaged in active learning compared to novice students. Perhaps clinical instructors need to be more cognizant of the teaching styles they use during clinical education so they are better able to adjust the teaching style to the level of student to encourage more active involvement. It appears that the quality of the clinical experience, specifically the percentage of time-on-task activities, may have more relevance than improving the specific curricular aspects that were included in this study. Students who are more active and productive during clinical education may be better predictors of success than a specific curricular characteristic.

Although the variables researched in this study were viewed as important curricular aspects of clinical education, it becomes apparent that many other factors are involved in clinical education that may contribute to student learning. The quality of

clinical education may be dependent on the quality of the clinical instructor (Starkey, 1997; Gardner, 1995; Moul, 1997; Vanic, 1998). In addition, the time that clinical instructors devote to the education of the student, the workload of the clinical instructor, the learning environment of the clinical site in terms of adequate space, equipment, and supplies for learning may all have roles in the amount of learning that takes place in clinical education (Weidner & Laurent, 2001). In addition, the clinical site must have an environment conducive for learning. A site that is overcrowded with patients, staff, and students may hinder the potential for learning at that site (Laurent & Weidner, 2002).

Although this study investigated the amount of teaching styles used for instruction, it only assessed if there was a relationship between more teaching styles used in a program and the overall initial success of that program based on initial examination scores. As has been found in other research, there are many aspects to teaching styles that may have an impact on learning in athletic training (Everitt & Carifio, 2001; Livecchi, Stemmans, Merrick, & Ingersoll, 2001; Harrelson, Leaver-Dunn, & Wright, 1998; Mensch & Ennis, 2002; Wiksten, Patterson, Antonio, De La Cruz, & Buxton,1998; Fincher & Wright, 1996). The focus of this study was not to investigate teaching styles in depth, but more so to identify the more common modes of instruction and instructional strategies that take place in programs that are more successful on the NATABOC examination.

Other variables associated with clinical education that were found to be not significant with initial success on the NATABOC examination were the number of practicum/laboratory courses offered in the curriculum and number of days per week of clinical education. Per CAAHEP accreditation standards, all accredited programs must

have a minimum of four practicum/laboratory courses for semester-based programs, and six for programs using a quarter system. According to the results of this study, programs that require more practicum/laboratory courses than the minimum standards requirement do not perform better on the NATABOC examination.

This finding can have important implications in athletic training education as it can serve as a reference for CAAHEP and those who develop the standards by which programs operate. During the periodic revision for the standards of accreditation, this information can be of value in the standards revision process. This finding should be addressed with caution as the range of responses for this variable was very broad. The sample's responses ranged between one and 38 for this item with a mean of 7.68. It is possible that respondent error may be responsible for the variability in this response. Some may have interpreted this item on the survey as the number of credit hours devoted to practicum/laboratory courses. Although there were few responses in the upper range, it may still have been enough to skew the results.

In reference to the number of days per week the athletic training students are required to participate in clinical experiences, no significant relationship was found indicating that students who spend several days in clinical education per week fare no better on the NATABOC examination than students who participate in less days per week. This finding can have vast implications in the structure of the curriculum in clinical education. The descriptive statistics show that the number of days per week students participate in clinical education ranges from two to seven days. This means that students who participate in only two days per week of clinical education are no more likely to pass the NATABOC examination than students who participate in clinical

education seven days a week. The mean for all responses was 4.91 (see Table 10), indicating that many students are involved in clinical education at least every day of the week. This finding supports the work of Dewey in that not all experiences provide for positive learning effects (Slattery, 1995). This implies that perhaps those students who are spending several days per week in clinical education may not be benefiting from that experience from a learning perspective. Since educational reform in athletic training is relatively young, and there is currently a large number of athletic trainers transitioning from the observational experience model of the internship route to certification, some clinical experiences may not provide for the best learning opportunity. There are still clinical instructors that utilize athletic training students as cheap labor, socializing them into the profession by performing meaningless day-to-day tasks instead of following the prescribed learning objectives and providing a true experiential education.

As the data from this study show, students on the average are participating in clinical education at least five days per week. Additionally, it appears that the frequency per week of clinical education is not related to initial examination success. Therefore the findings of this study can be used to influence program directors and clinical coordinators to reexamine their scheduling practices for the clinical experiences. With the increased cost of higher education, many students rely on outside income to support themselves. Most students on the average are spending five days per week in clinical education, which by most common practices occurs during the afternoons and evenings, it becomes more challenging to find time for outside employment or merely participate in the social practices of being a college student.

Clinical education is meant to be a learning environment and not to be used as a means of student labor to help with the day-to-day operations of the sports medicine department. Students that view clinical education as work are more likely not to learn during this experience. Perhaps the findings of this study can change the way in which clinical education is viewed by the athletic training staff and faculty, and will encourage further investigation into these common practices.

Overall, the variables associated with clinical education only accounted for 14.18% of the variance in the criterion. The low amount of variance explained by this factor might have contributed to its nonsignificance. Clinical education is an important aspect of the overall professional preparation of the athletic training student, therefore further research in the aspects of clinical education is warranted.

Another finding of this study indicated there was no significant relationship between curricular attributes associated with coursework and instruction and first-time passing rates on the NATABOC examination. Factor analysis revealed that the following variables were associated with coursework and instruction: 1) the number of courses in which the athletic training competencies were instructed and evaluated, 2) the frequency of student supervision during the clinical and field experiences, 3) the utilization of allied health professionals (other than a certified athletic trainer) for instructional purposes, 4) the length of the academic program in terms of semesters/quarters, 5) testing practices that mirror the practical portion of the NATABOC exam, 6) the total number of athletic training-related courses in the core curriculum, and 7) the number of courses offered in the curriculum that address the 20 expanded subject matter areas per the accreditation guidelines. These seven curricular attributes when grouped as a composite of factor

scores were not significantly related to initial success on the NATABOC examination. Likewise, independent analysis of these variables revealed no significance as well.

These findings were surprising to the researcher in that it was originally hypothesized that these variables would be of benefit to increasing passing scores on the examination. The fact that these findings disagree with the literature is also of concern to the researcher. The supervision of athletic training students during clinical experiences has been shown to be an effective part of student learning (Anderson, Larson, & Luebe, 1997).

According to Curtis et al. (1998), proper supervision of the athletic training student should include frequent explanations, demonstration, constructive feedback, and nurturing by the supervising instructor. A common problem with the supervision of the athletic training student is that the clinical instructor is more inclined to be supervising them from a service-provider perspective as opposed to the intended purpose of the education perspective. Therefore the behavior of the clinical instructor providing supervision of the student can have a profound effect on their learning (Curtis et al.). Students are often misused as service providers and are expected to spend clinical education time as unpaid workers. This type of supervision practice may contribute to the lack of involvement of the student during clinical assignments, as well as stimulate activities that do not foster a learning of the student. According to Weidner and Pipkin (2002), clinical supervision of athletic training students needs improvement. In several instances, athletic training students are being supervised by recent graduates, which was found to compromise the learning of the student (Stemmans & Gangstead, 2002). According to the findings of Stemmans and Gangstead (2002), athletic training students

are less likely to initiate interactions with novice clinical instructors and supervisors, thus affecting student learning.

The literature seems to be consistent in that student learning is largely reliant on the quality of supervision provided during the clinical experience. In addition, the amount of experience the clinical instructors possess is also linked to student learning. This study merely looked at the frequency of supervision provided by the clinical instructor. As the results of this study indicate, there was no significant relationship between more frequent supervision and higher passing rates on the NATABOC examination. The descriptive statistics indicate that 93.7% of all respondents continuously supervise their students during the clinical experience. Although this seems to be an extremely high percentage, it is apparent that some directors of programs indicate that continuous supervision takes place, but yet are not producing graduates who perform well on the first attempt on the certification examination. Since continuous supervision is not related to increased performance on the NATABOC examination, this adds validity to the argument that the quality of supervision is paramount. Although the frequency of supervision should not be overlooked as an important component to a curriculum, perhaps future studies can investigate if there is a relationship between examination success and quality of supervision.

Another finding of this study that was surprising to the researcher was that the amount of semesters required in a curriculum, or program length, is not related to examination success. This was also found by another study (Castle, Gangstead, & Johnson, 2001) and can provide support for programs that offer programs of only two years in length. There is some concern in the athletic training education field that

programs of two years in length (or four semester/six quarters) may experience difficulty ensuring that students are being prepared well enough to pass the NATABOC examination as well as for their future careers.

This finding suggests that program length alone is not related to examination success, therefore should not be regarded as a target for program weakness. Program directors should evaluate their individual programs, regardless of program length, and attempt to correct any problems within the current curriculum that may contribute to student failure. This finding can also have implications in the decision-making process at the accreditation level in that it can be used as support for maintaining the current standards regarding program length. If the standards should be reviewed in the future and suggestions are made to increase the requirement of program length, this study can be of some use during deliberations.

Additional findings that were not related to initial success on the NATABOC examination include the number of athletic training-related courses and the number of courses that address the 20 subject matter areas outlined in the accreditation standards that are offered by the curriculum. The number of courses in which competencies are instructed and evaluated as well as testing practices that mirror the practical portion on the NATABOC examination were also not significant.

According to these findings, graduates of programs with fewer athletic training courses in the curriculum are performing as well on the NATABOC examination as programs with several athletic training-related course requirements. Likewise, programs that use fewer courses to address the required subject matter areas, and utilize fewer

courses to instruct and evaluate the athletic training competencies perform just as well on the NATABOC examination as programs that offer more coursework.

These findings can be of some importance, but should be interpreted with caution. The ranges of responses for these variables were quite large (see Table 10), particularly the upper range of responses. It is possible that the respondents misinterpreted the items as asking for the number of credit hours, as opposed to the number of courses. This would help to explain why some programs indicate they offer 56 athletic training-related courses in their curriculum. The same holds true for the other variables mentioned. Although these relationships were not significant, they should be assessed in future studies with an emphasis placed on the requesting the number of courses only. This can help to reduce any possibilities of error in the data.

It has been recommended that programs employ testing practices similar to what is experienced on the NATABOC exam to better prepare students for examination success (Erickson & Martin, 2000). This makes logical sense, but unfortunately was not found to be a predicting variable in the current study. Further investigation should be done in this area because it would seem likely that students who are prepared in a testing format similar to what would be experienced on the NATABOC examination should fare better just on testing comfort alone. Future research should assess the various testing methods used in athletic training education and see if there is a positive relationship to initial examination success.

Programs that reported weekly usage of allied health professionals for instructional purposes performed no better on the NATABOC examination than programs that did not use them at all. This is an interesting finding as it pertains specifically to a

standard for CAAHEP accreditation. Standard I B 1.d states "there should be involvement of various medical and other health care personnel in the formal or informal instruction", (CAAHEP, 2001). Additionally, the recommended guideline for that standard suggests that programs are "encouraged to expose the student to as many individual professionals and professions as appropriate", (CAAHEP, 2001). The finding by the current study can have direct implications to this standard for accreditation. If it is found that utilizing allied health personnel for instruction does not improve programmatic outcomes in terms of examination scores, then perhaps we need to investigate the necessity of this standard for accreditation, or at the very least, investigate the positive benefits of utilizing allied health personnel for instruction.

The variables that were associated with program intensity were also found to be not significantly related to first-time success on the NATABOC examination, both when analyzed as a set of composite scores as well as independently analyzed. These include 1) the total number of clinical rotations students experience in the curriculum, 2) the average length of the clinical rotation in terms of weeks, 3) the amount of hours students spend at each clinical experience, 4) the ratio of students to clinical instructors, and 5) the requirement of inservice attendance.

It was surprising that the findings indicated that the number of clinical rotations experienced in a curriculum has no effect on initial passing rates. This finding is contrary to what was determined in a study by Miller and Berry (2002) where it was found that variations in clinical rotations enhance learning and clinical competency achievement. Assigning students to various clinical settings for the practice and application of acquired skills allows them to interact in multiple settings. Students may get bored or simply not

like a certain clinical rotation, thus decreasing their learning during that experience. The rotation of students through a variety of clinical settings and sites might expose students to learning opportunities they might not have experienced otherwise. Additionally, Laurent and Weidner (2002) state that a variety of clinical experiences is important to student learning because it can provide for more opportunities to observe and interact with other clinical instructors, which can broaden the students learning experiences.

In addition to the number and variety of clinical rotations with which students are required to participate, the quality of the clinical education site can also play a large role in the learning of the student. Clinical education sites should be selected on the basis of their ability to prepare students for their career, not because they are the popular favorite among the students. Laurent and Weidner (2002) indicate that failing to objectively select and evaluate clinical education sites may result in chance learning of the student. Weidner and Laurent (2001) outline several standards for the selection evaluation of quality clinical education sites. These researchers encourage administrators to select a clinical site that will serve as a valuable learning resource and contribute to the overall learning of the student.

Although this study found that there was no correlation between the number of clinical sits and initial success on the NATABOC examination, this does not discount clinical sites from providing some benefit to the students' education. These findings combined with the findings from the literature bring many facets about a clinical site to the surface. Future studies should keep theses factors in mind when assessing the effectiveness of a clinical site for athletic training education.

Another factor to consider when deciding upon clinical sites is the length of time a student will spend at each clinical rotation. This study found that the average length of time spent at one individual clinical rotation was 13 weeks. Although the results of this study indicated that the number of weeks spent in a particular clinical rotation does not affect first-time success on the NATABOC, consideration should still be given to this issue.

Administrators responsible for the design of the clinical curriculum must be aware of the learning that takes place at the clinical sites. Some clinical sites may welcome a shorter duration of that experience while others it may be best to keep the students at that site for the duration of the semester or quarter. This finding can help program directors and clinical coordinators decide if the length of the clinical rotation experience should last an entire semester, length of an entire sport season, or rotate students through a number of different sites lasting only a few weeks each.

According to the results of this study, neither the number of clinical rotations required nor the number of weeks spent at a particular site has an effect on initial examination success. Therefore program administrators should design the clinical curricula according to what works best for their program. This study looked at the average number of weeks spent during a clinical rotation, but it would be interesting to see if there is a correlation with passing rates and clinical experiences that last the duration of a sport season. Future studies should also solicit students' perceptions of the length of a clinical experience and determine if there is a relationship between clinical rotation length and student learning.

Another issue that is of great concern by the athletic training community is the number of hours athletic training students spend during the clinical experience. The results of this study were not significant for the relationship of the number of hours spent during clinical education and examination rates on the NATABOC examination. Although it was hypothesized that students who perform better initially on the NATABOC examination spend more hours in clinical education than those who do not perform well, it is acceptable to the researcher that this hypothesis was rejected.

The rationale behind the hypothesis was that if students spend more time during clinical education, they will be better exposed to a variety of health conditions, and provided with more opportunities to perfect their clinical skills. It has become apparent through further review of the literature, that quite the opposite can take place during lengthy experiences in clinical education. As Dewey has pointed out, some experiences utilized in a curriculum may not be positive educational events (Slattery, 1995).

When hours are required by a program to be accumulated and tracked, students usually count hours that are not productive, thus not contributing to their overall learning during that experience. Many activities that students count toward their hour requirement entail cleaning, restocking supplies, or periods of downtime in the athletic training room where mostly socialization takes place. Miller and Berry (2002) found that 59% of the athletic training students' clinical placement time was spent in unengaged activities, or activities that do not contribute to learning. These activities are not conducive to learning and if are counted toward the hour requirement will not maximize their potential for learning athletic training related skills.

This finding also agrees with the literature (Turocy, et al., 2000; Middlemas et al., 2001; and Draper,1989) in that the total number of clinical hours accumulated is not related to examination success. These researchers suggest the quality of the experiences should be evaluated as opposed to the quantity of the experiences. The NATABOC has since eliminated its clinical hour requirements for examination candidates beginning in the 2002-2003 academic year. Prior to this date, students had to document a minimum of 800 hours of clinical experience to qualify to sit for the NATABOC examination. With the elimination of the clinical hour minimum requirements, it is no longer required by the NATABOC to include the accumulation of hours as part of the programs' curricular requirements.

At the time of data collection for this study, programs were still required to provide a minimum of 800 hours of clinical experience for its students. Since it has been shown that the number of clinical hours acquired during clinical education is not related to examination success, then perhaps athletic training educators need to place more emphasis on the quality of the clinical experience. Such things as accomplishment of learning objectives, practicing and perfecting athletic training skills, and developing clinical proficiency in its students during the clinical experience should become the focus of clinical education, not the amount of hours a student has accumulated.

Perhaps athletic training education might benefit from a better application of Tyler's work in that it should better express the importance of learning objectives as well as utilizing these objectives to establish more useful learning experiences. Athletic training educators already have the learning objectives provided for them (*Athletic Training Educational Competencies,* 1999), but perhaps they should be more attentive in

the manner in which they use them. An improvement in the design of the athletic training experiential component of the curricula is needed. This would more properly follow the advice of both Tyler and Dewey, in that experiential learning is taking place in clinical education, but its foundation lies within the correct application of the learning experiences for the design of the experiential learning. Future research should look at how well the experiential component of the athletic training curricula is actually based on specific learning objectives for that clinical experience, or in a sense, how well the Deweyan and Tylerian philosophies are utilized in athletic training education.

Since the NATABOC clinical hour requirement is no longer in existence, perhaps future research could examine why programs are including this requirement in their curriculum, or if they are not, examine how the effectiveness of clinical education is measured. Additionally, if program directors were using the accumulation of clinical hours as a means of ensuring exposure to a variety of conditions, then perhaps we need to research other means of increasing learning productivity during clinical education.

In addition to the number of hours spent during clinical education, as well as the length and number of clinical rotations being a contributor to program intensity, the ratio of students to clinical instructors can play an equally important role in the education of the student. Although the ratio of students to clinical instructors was not found to be a contributing factor to initial examination success, many other studies have found it to be an important consideration in making clinical assignments. The number of students that are assigned to each clinical instructor can vary depending on the academic and experience level of the student, the length of the student's assignment, the nature of the clinical site, as well as the workload of the instructor (Weidner & Laurent, 2001).

The data from this study showed that on average every clinical instructor is responsible for supervising and teaching 5.41 athletic training students. The original hypothesis was that the smaller the ratio of students to clinical instructors the greater success seen on the NATABOC examination. The theory behind this assumption was also supported by Laurent and Weidner (2001) in that the fewer number of students each clinical instructor was responsible for the more time allowed for individualized instruction. Although this hypothesis was not upheld, further research to identify the most effective ratios of students to clinical instructors should be done.

Other findings from this study that are important to note are that the usage of inservices to supplement education and the number of faculty with only teaching responsibilities are not related to examination success. The average frequency of inservices by the sample was that they occur at least on a monthly basis. Often inservices involve presentations and discussions led by physicians and other allied health personnel, to present specific injury case studies or learn alternative techniques not addressed in class. Although it would appear as though these would be very beneficial to the student as well as expose them to a variety of medical professionals, they do not appear to help with first-time success on the NATABOC examination.

The same argument holds true for the number of faculty who only have teaching responsibilities and do not have clinical athletic training expectations. It would seem logical that more faculty with only teaching responsibilities, as opposed to those with both teaching and clinical responsibilities, would have more time to devote to teaching and the quality of instruction they provide. This logic was supported by Williams, et al. (1999), but was not found by the current study. Future research should attempt to

identify students' satisfaction of the quality of instruction they receive from both faculty with clinical and academic responsibilities and faculty with only academic duties. Additionally, since most athletic training educators are not formally trained in pedagogy skills, and the results of this study indicate that more teaching faculty does not increase initial passing rates on the examination, then more research needs to be done on the pedagogy knowledge of the clinical faculty.

One final variable that was analyzed for its relationship to initial passing success on the NATABOC examination was the grade point average required for admission to the athletic training programs. Grade point averages and their relevance to academic success have been studied extensively in the athletic training literature (Castle et al., 2001; Draper, 1989; Erickson & Martin, 2000; Harrelson et al., 1997; Keskula, Sammarone, & Perrin, 1995; Middlemas et al., 2001; Turocy et al., 2000; Williams et al., 1999). This theory is based on the premise that a student who succeeds in the classroom and maintains a high grade point average will more likely perform better on the NATABOC examination.

Although the studies in the literature have found that grade point average is linked to examination success, the current study found otherwise. There were a total of 60 responses for this survey item with a mean grade point average of 2.54 for admission to the athletic training programs. Perhaps the reason for this finding is based on the relatively small sample size compared to the population (39%). It is recommended that further study be done to assess the correlation between grade point averages and NATABOC examination success.

Limitations

Many studies have found positive relationships between predictor variables and success on certification examinations. While these studies were successful in their findings, this investigation demonstrated that none of the variables analyzed in this study can be used to predict initial success on the NATABOC examination. This study had several limitations that may have contributed to the overall validity of its findings. Therefore the ability to generalize the results should be done with caution.

At the time of this study many programs were in a state of flux attempting to conform to the new 2001 standards and guidelines for accreditation. Many programs were still under the old standards for accreditation causing some inconsistencies in the results. Therefore the results of this study might not be as applicable as had originally planned. This study should be repeated and data gathered from institutions that are following the new standards for accreditation.

Additionally, many programs included in the sample were very recently accredited. This may account for some of the results obtained by the study, in that these programs may not have had adequate time to implement changes to increase the overall effectiveness of their curricula. One of the goals of an accredited program is to generate outcomes that demonstrate overall program effectiveness. In many cases, the first-time passing rates on the NATABOC examination becomes the standard by which all programs strive to improve. Programmatic data should have been obtained to see if there is a difference in passing rates between new programs and the ones that have had time to become established. This might have provided for better interpretation of the results.

Another limitation of the study was that only the overall passing rates of the NATABOC examination were assessed. The NATABOC examination consists of three sections: 1) a written multiple choice test, 2) an oral/practical exam, and 3) a written simulation examination. Perhaps more meaningful results could have been produced that identify relationships between certain curricular attributes and one of the three sections of the NATABOC exam. This kind of data might have implications that are more desirable to program administrators.

Other limitations that may have contributed to the results of this study include the turnover of program directors included in the sample. At the time of data collection several position vacancies were posted, which may have contributed to inaccurate responses by the sample. Program turnover may also have contributed to the relatively small return rate of the sample. This in combination with the events of September 11, 2001 may have been large contributors to the low number of responses obtained. With the scare of anthrax found in the mail, solicitations for responses occurred only once. Since data collection took place shortly after the terrorist attacks, it was the researcher's decision to attempt data collection only once. This probably accounted for the smaller sample size that was originally intended. This study should be reproduced attempting to increase the sample size in order to produce more valid results.

The wording of some items on the survey instrument may have created confusion with the respondents. Several items received a large range of responses, many of which were inconceivable. This indicates that some of the items were not understood by the sample. Additionally, some items on the survey were left open-ended for an easy reply from the respondent. This only seemed to add to the wide range of responses provided

and added to the variance of each variable. Although pilot testing was done to ensure face validity of the survey instrument, perhaps more rigorous pilot testing was needed to ensure that the survey instrument was in fact both valid and reliable. Another limitation of the survey was that it did not assess any kind of demographic data. This information could have been valuable to the researcher as it may have been used in the interpretations of the results as well as other analyses based on specific demographic considerations. The number of students enrolled in the programs as well as the number of years the programs had been in existence could have provided for useful insight of the results.

Additional limitations of the study consist of self-reported data that may have been biased, the large number of independent variables assessed may have affected the statistical power of the study, and only data from one academic year was analyzed. As indicated from the results of this study, the inclusion of the following curriculum attributes do not appear to make a difference in the first-time passing rate on the NATABOC examination. Although statistically the results of this study only indicate that the number of clinical opportunities may lead to better initial success on the NATABOC exam, the development of an exemplary curriculum in undergraduate athletic training has yet to be determined. Further research should be conducted to attempt to identify additional curricular attributes that lead to success on the NATABOC examination.

Future Research

It is the hope of the researcher that this study serve as an impetus for further inquiry and research in the area of athletic training education. Identifying potential predictors of success on the NATABOC examination can be very useful to athletic

training educators. The lack of significance in the analyses suggests that the variables tested have little value in predicting success on the NATABOC examination. Perhaps there are other contributors to success that were not identified or analyzed by this study. This gives reason for further investigation in the area of curriculum assessment, and how it may contribute to overall student success.

In addition, athletic training programs are required to instruct the athletic training competencies and clinical proficiencies per accreditation guidelines, yet the first-time passing rate on the NATABOC examination remains relatively low. Then perhaps future studies should take a look at the reasons for this inconsistency to determine if students are being tested on what they are actually being taught. Although this study looked at specific curricular attributes that may lead to better success on the NATABOC examination, the variables tested were based on the standards for accreditation. Since the results of this study were not significant, then perhaps future research should investigate if the content in the document *Athletic Training Competencies and Clinical Proficiencies* is valid compared to what is being assessed through the NATABOC examination.

Additional suggestions for further research include 1) analyzing the passing rates of each section of the NATABOC examination individually for correlations with various curriculum characteristics, 2) investigate curriculum effectiveness via other measures of academic achievement, such as employer satisfaction, employment rates, and alumni surveys, 3) analyze demographic data such as age, ethnicity, institution size, enrollment figures, etc., 4) investigate student perceptions of the quality of instruction they receive by both clinical and academic faculty, 5) analyze examination preparation strategies and study habits of candidates for the NATABOC examination, 6) identify characteristics of

quality supervision, and 7) assess the effects of technology implementation in the athletic training curriculum.

Conclusion

The purpose of this study was to examine CAAHEP accredited entry-level undergraduate athletic training curricula to determine what makes an exemplary curriculum based on attributes of the individual programs and success rates of graduates on the National Athletic Trainers Association Board of Certification Examination. In addition, the purpose of this study was to identify an exemplary curriculum in undergraduate, entry-level athletic training education and formulate a model from the research of an ideal curriculum for others to replicate.

Although there has been extensive research in an attempt to improve athletic training education, it is apparent that a problem exists with the current passing rates on the NATABOC examination. According to the results of this study, curricular attributes relating to course work and instruction, clinical education, and program intensity do not assist programs in producing graduates that achieve first-time success in passing the NATABOC examination. Additional results indicated that the following curricular attributes do not assist programs in achieving initial success on the NATABOC examination: 1) length of a program in semesters/quarters, 2) the number of practicum/laboratory courses, 3) number of athletic training-related courses, 4) number of courses that address the 20 required subject matter area, 5) requirement of supplemental inservices/workshops, 6) number of courses that instruct and evaluate the athletic training competencies, 7) number of clinical experience rotations, 8) duration of clinical experiences in weeks, 9) frequency in days per week of clinical education, 10) number of

clinical sites, 11) number of hours spent at each clinical experience, 12) accountability of skill demonstration, 13) testing practices that mirror the NATABOC practical portion of the exam, 14) use of allied health professionals for instruction, 15) utilization of more teaching styles, 16) student to clinical instructor ratio, 17) frequency of supervision, 18) faculty with only teaching responsibilities, 19) program admission grade point average. The study found only one curriculum variable to be significantly related to higher initial passing rates on the NATABOC exam. The number of clinical opportunities provided by a program was found to be significantly related to higher initial passing rates on the NATABOC exam.

The need to determine what attributes constitute an exemplary curriculum is important to help students select a program that will better suit their needs and prepare them for success in the future. In addition, the identification of potential predictors of success on the NATABOC examination can be very useful for athletic training educators and administrators. The findings of this study can have practical implications in the field of athletic training education. These results can assist program directors in making valuable decisions regarding revisions of existing curricula as well as assist in the development of new programs. Administrators and educators in the field can use the information provided by this study for the purposes of program enhancement and the development of clinically proficient graduates. With a better understanding of what curricular characteristics lead to improved success on the NATABOC examination, educators can better prepare their students for the examination as well as their future careers.

As the results of this study indicate, it is apparent that a problem exists with first-time success on the NATABOC examination. The results of this study can make a contribution to the body of knowledge in athletic training education, making specific recommendations to the field about the curricular elements that may help to address the problems with examination success. Since the NATABOC examination is based upon the findings of the *Role Delineation Study* and is proven to be a valid and reliable testing instrument for the athletic training profession, then perhaps we need to consider the need for further research to investigate if the standards for the accreditation of athletic training education programs are also valid and coincide with the current standard form of assessment. This may also mean a review of the current CAAHEP *Standards and Guidelines for the Athletic Trainer* as well as a review of the *Athletic Training Educational Competencies* to confirm that these curriculum guiding documents are adequate in content and are also reflective of current practice in athletic training. Further research needs to be done in athletic training education, particularly in the area of curriculum as it relates to improved outcomes.

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Appendix A

Study Questionnaire

Athletic Training Education Program Survey

The following items pertain to curriculum characteristics of Athletic Training Education Programs. Please indicate the appropriate response as it pertains to your education program. Carefully read the instructions and each item before responding. Please indicate only one response per item unless otherwise instructed to do so. The information from this survey will remain confidential and will only be reported as sample-wide distribution. ***Simply write your response(s) to the questions in the provided space or check the appropriate response on this survey. Please use the provided stamped/addressed envelope to return your completed survey by December 1, 2001.***

1. Indicate the total number of academic credit hours in your undergraduate Athletic Training core curriculum, and the length of your program in terms of semesters **or** quarters / trimesters **(Example: 68 total credit hours, 6 semesters)**

   Total credit hours _____ Semesters ____ Quarters / Trimesters ____

2. Indicate the number of courses offered in your curriculum which relate specifically to the educational domains of Athletic Training.

   _____

3. Indicate the number of practicum / laboratory courses offered in the Athletic Training curriculum.

   _____

4. Indicate the number of courses your curriculum offers to address the 20 expanded subject matter areas outlined in the *2001 Standards and Guidelines*.

   _____

5. Indicate the frequency in which informal educational inservices are offered for Athletic Training Students, to serve as supplemental instruction and interaction.

   Never ____ Weekly ____ Monthly ____ Once per semester ____ Other _____

6. Indicate the average number of courses in which the Athletic Training educational competencies are taught and evaluated. **(Example: Competencies in the risk management domain are met in 5 classes).**

   _____

7. Indicate the average number of various clinical and field experience rotations Athletic Training Students are exposed to during the entire clinical education of your program.

   _____

8. Indicate the average number of weeks that represents each clinical experience or rotation for the following. **(Answer only those that apply to your program).**

Freshman students _____ Junior students _____

Sophomore students _____ Senior students _____

9. Indicate the number of days per week students are expected to participate in clinical experiences. **(Answer only those that apply to your program).**

Freshman students _____ Junior students _____

Sophomore students _____ Senior students _____

10. Rank the domains of Athletic Training most often taught in your curriculum **(Rank 1-6 only). 1 = most often, 6 = least often**

Domain 1 Prevention of athletic injuries/illnesses _____

Domain 2 Recognition, Evaluation, and Assessment _____

Domain 3 Immediate Care _____

Domain 4 Treatment, Rehabilitation, and Reconditioning _____

Domain 5 Organization and Administration _____

Domain 6 Professional Development and Responsibility _____

11. Indicate the specified number of hours required for an assigned clinical experience.

0 ____ 1-50 ____ 51-100 ____ 101-150 ____ 151-200 ____ 201+ ____

12. Are students held accountable for learning, practicing, applying, and demonstrating the cognitive, psychomotor, and affective skills during the clinical experiences on a regular basis?

YES _____ NO _____

13. Indicate the frequency (per day) in which Athletic Training Students are given the opportunity to practice and perfect clinical skills while being supervised by a Certified Athletic Trainer.

_____

14. Please identify the clinical education sites which are utilized on a regular basis in the Athletic Training Education Program **(please check all that apply).**

Physical Therapy Clinic ___	College/University Training Room ____
Professional Sports ___	College/University Health Center _____
Amateur Athletic Events ____	Recreation/Intramural Sports _____
Physician Office ____	Emergency Room _____
Exercise Physiology Lab ____	Occupational Therapy _____
High School ____	Club Sports _____
Podiatry _____	Radiology _____
Hospital _____	Community / Junior College _____
Division I Athletics _____	Division II Athletics _____
Division III Athletics _____	NAIA Athletics _____

Other_____

15. Identify the frequency in which the testing methods in the Athletic Training courses mirror the practical portion of the NATABOC certification examination.

Never _____ Occasionally _____ Frequently _____ Always _____

16. Indicate the frequency in which various health professionals (other than ATC's) are utilized for course instruction.

Never _____Weekly ____ Monthly ____ Once per semester ____ Other _____

17. Indicate your established ratio of students to clinical instructors used in your Athletic Training education program.

1:1 ____ 2:1 ____ 3:1 ____ 4:1 ____ 5:1 ____ 6:1 ____ 7:1 ____ 8:1 ____

greater than 8:1 ____

18. Indicate which teaching styles are used for instruction in the Athletic Training curriculum **(please check all that apply).**

Lecture _____ Discussion _____ Student Presentation _____

Scenarios ____ Case-studies _____ Demonstrations _____

Team Teaching ____ Narratives _____ Videos / films _____

Supervised Clinical Practice _____ Laboratories _____ Algorithms _____

Guest Lecture (other than ATC) ____ Interactive Software _____

Activities that involve critical thinking / problem solving _____

19. Identify the percentage pass rate of your students on their **first** attempt on the NATABOC examination for the 2000 – 2001 academic year.

0-20% ____ 21-40%_____ 41-60% _____ 61%-80% _____ 81-100% _____

20. Students in the Athletic Training program have opportunities with the following during their clinical education **(please check all that apply).**

Men's sports ____ Team sports ____

Women's sports ____ Individual sports ____

21. Indicate how often Athletic Training Students are supervised during the clinical / field experience.

Never ____ Once per day ____ Twice per day ____

Three times per day ____ Continuously ____

22. Indicate the number of faculty in your program. _____

23. Indicate the number of faculty who have teaching responsibilities only. **(Please do not count those faculty who also have athletic responsibilities).**

_____

24. Indicate the minimum GPA requirement for admission to your institution. **(Please check appropriate school catalog and policies).**

_____

25. Indicate the minimum GPA requirement for admission to your Athletic Training Education Program.

_____

Appendix B

Introductory Letter

Dear Undergraduate Athletic Training Program Director:

I am seeking your assistance in collecting information for a study on the Athletic Training entry-level undergraduate curriculum. The purpose of the study is to determine characteristics of the Athletic Training curriculum that contribute to higher passing rates on the NATABOC examination upon graduation of the Athletic Training Education Program. This study is part of a dissertation requirement to complete an Ed.D. degree in Curriculum Studies at DePaul University.

You will be asked to complete a questionnaire responding to questions regarding the clinical aspect of the curriculum, courses included in the curriculum, number of faculty that teach in the curriculum, teaching styles, and the first-time pass rate percentage of your program on the NATABOC examination. The survey will only take approximately five to ten minutes to complete. There is literally no risk to you as a participant. All questions on the survey relate to the curriculum of the program and are not an invasion of your privacy, or the students' privacy.

The information received will remain confidential and will be only reported as a sample-wide distribution. Please respond to the following items as completely as possible, if you wish to be a participant in this study. I greatly appreciate your reply and thank you for your time. Please return the completed survey via the enclosed self-addressed stamped envelope no later than December 1, 2001. As a benefit to you the results of the study will be available upon request.

Respectfully,

Aric J. Warren, MS, ATC-R, CSCS
Doctoral Candidate, DePaul University

Appendix C

Expert Panel Survey

Please respond to the following questions regarding the survey instrument (for pilot only)

1. Indicate the length of time needed to complete and submit the responses via email.

2. Were the survey items clear and understandable?

3. Was the survey complete, in terms of identifying attributes of clinical education?

4. Was the survey a valid indicator of identifying characteristics of an exemplary Athletic Training curriculum?

5. Please provide any additional information that may aid in the efficiency and / or efficacy of this survey instrument.

Appendix D

LRB Approval

LRB Memorandum

To: Aric Warren, Graduate Student, School of Education

CC: IRB Coordinator

From: Local Review Board

Date: 11/2/01

Re: Review of Protocol

The Local Review Board has received and evaluated your protocol application for your project entitled "Attributes of an Exemplary Curriculum in Entry-Level Undergraduate Athletic Training Education." Based on the review of your protocol application, consent form and assent form, your project has been classified as exempt, and the LRB has granted you approval.

The LRB would like to inform you that if any aspect of your exempt project changes after approval is granted, then the project would need to be re-screened by the LRB. Also be reminded that all exempt projects that last longer than one year must be reevaluated for exemption each year.

Thank you for your cooperation and please feel free to contact the LRB if you have any questions or concerns.

Sincerely,

Ronald Chennault
Co-Chair, LRB

Vita

Aric J. Warren
5330 Nall Ave.
Roeland Park, KS 66202

Education

DePaul University, Chicago, IL
EdD Curriculum Studies - 2003

Michigan State University, East Lansing, MI
M.S. Physical Education/Exercise Science, Emphasis in Athletic Training - 1996

University of Nebraska at Kearney, Kearney, NE
B.S. Fitness and Leisure Management, Emphasis in Athletic Training – 1994

Experience

University of Kansas, Lawrence, KS
Program Director-Athletic Training, Instructor, July 2000 – present

DePaul University, Chicago, IL
Assistant Director of Sports Medicine, Adjunct Faculty, August 1997 – July 2000

Grand Island Physical Therapy and Sports Clinic, Grand Island, NE
Athletic Trainer, July 1996-July 1997

Publications

Warren, Aric J., Mallette, T. (2002). The friction and traction characteristics of various shoe-surface interface combinations on natural and artificial turf. *Journal of Athletic Training, 37*(2): S94.

Presentations (most recent)

Warren, Aric J. (March 2003). *The effects of an over-the-counter orthotic on lower extremity kinematics in male and female subjects.* Poster presented at the Mid America Athletic Trainers' Association Annual District Meeting. Sioux Falls, SD.

Warren, Aric J., Mallette, T. (June 2002). *The friction and traction characteristics of various shoe-surface interface combinations on natural and artificial turf.* Paper presented at the National Athletic Trainers' Association Annual Meeting and Clinical Symposia. Dallas, TX.