

LEARNING STYLE CHARACTERISTICS OF ATHLETIC TRAINING STUDENTS
IN CAAHEP ACCREDITED ATHLETIC TRAINING EDUCATION PROGRAMS

by

Eric J. Fuchs

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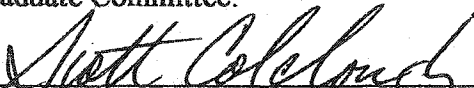
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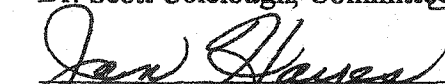
LEARNING STYLE CHARACTERISTICS OF ATHLETIC TRAINING
STUDENTS IN CAAHEP ACCREDITED ATHLETIC TRAINING
EDUCATION PROGRAMS

Approved:

Graduate Committee:



Dr. Scott Colclough, Committee Chair



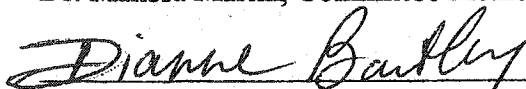
Dr. Jan Hayes, Committee Member




Dr. William Whitehill, Committee Member



Dr. Malissa Martin, Committee Member



Dr. Dianne Bartley, HPERS Department Chair



Dr. Robert F. Carlton, Dean of Graduate Studies

ABSTRACT

FUCHS, ERIC J., D.A. Learning Style Characteristics of Athletic Training Students in CAAHEP Accredited Athletic Training Education Programs. (2003). Directed by Dr. Scott Colclough. 68 pp.

Little is known about athletic training students, and still less is known about how they learn (Harrelson, Leaver-Dunn, & Wright, 1998). Allied health professionals, medical students, and nursing students are among the most frequent subjects of learning style and demographic investigations (Harrelson, et al., 1998). An educator who identifies and understands the learning styles of his or her students has an advantage in developing more effective curricular and course lessons prior to the beginning of a semester.

Athletic training education program directors and faculty need to understand the demographics and learning styles of students accepted into current and future athletic training education programs to enhance student educational experiences and outcomes. Cavanaugh and Coffin (1994) found instructional preferences directly influence the ways in which people learn. Kolb (1985) hypothesized that a person's learning style influences the initial selection of a profession and is accentuated as one learns the profession's norms.

This study identified and compared the learning style characteristics of pre-admission and senior students of CAAHEP accredited entry-level athletic training education programs. The chi square statistical analysis of the data collected in this study led to failure to reject the null hypotheses H_1 ($\chi^2 = 5.76$; $p = .124$; $df = 1$), H_2 ($\chi^2 = .889$; $p = .346$; $df = 1$), and H_3 ($\chi^2 = 13.209$; $p = .153$; $df = 9$). The sample size in this study

(N = 131) was sufficient to ensure that the minimum and expected cell counts were within operational parameters for chi square cross tabulation analyses.

This study found no significant differences in the types of learning style characteristics between pre-admission athletic training students and senior athletic training students. No significant differences were found between male and female pre-admission and senior athletic training students. In addition, senior athletic training students were not more likely to have a pattern of learning styles primarily composed of converger and diverger learning styles. This study confirms the findings of Coker (2000) and Harrelson et al., (1998), which found no dominate learning style among athletic training students.

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CHAPTER I

Introduction

Statement of the Problem

Athletic training education is undergoing extensive educational reform. By January 1, 2004, any person seeking certification from the National Athletic Trainers' Association Board of Certification (NATABOC) must complete an Athletic Training Education Program (ATEP) accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP) (Hunt, 1999). The accreditation process for athletic training education programs has been under constant review and change (Hunt, 1999; Denegar, 1997; Mathies, Denegar, & Arnold, 1995). Research in the field of athletic training education has increased proportionally with educational reform. This increase includes research concerning clinical proficiencies, NATABOC exam passing rates, Athletic Training Education Program (ATEP) directors' roles and responsibilities, Clinical Instructor teaching effectiveness, and ATEP student retention and attrition rates (Gibson, 1998; Harrelson, 1997; Mathies, et al., 1995; Starkey & Henderson, 1995). However, information available to the athletic training educator describing the type of student entering ATEPs is nominal (Fuller, 1997).

The subjects of learning styles and demographics are most often investigated in allied health and medical professions, with nursing students studied most frequently (Harrelson, Leaver-Dunn, & Wright, 1998). Beyond the publication of athletic training

student (ATS) certification exam results, little is known about athletic training students, and still less is known about how they learn (Harrelson, et al., 1998). Only four studies (Brower, Stemmans, Ingersoll & Langley, 2001; Coker, 2000; Draper, 1989; Harrelson, et. al., 1998;) have been found regarding the evaluation of undergraduate athletic training students learning styles.

Athletic training education program directors and faculty need to understand the demographics and learning style characteristics of students accepted into current and future athletic training education programs to enhance student educational experiences and outcomes. "An individual's learning style refers to a student's manner of using and acquiring information in a problem-solving environment" (Holley & Jenkins, 1993, p. 302). Cavanaugh and Coffin (1994) found instructional preferences directly influence the ways in which people learn. Vermunt (1998) considered the way a student learns to be the student's learning style. Aaron and Skakun (1999) defined learning style as "the strategy that a student brings to a learning situation, which is influenced by personal characteristics, previous experience and the environment" (p. 260). Kolb (1985) hypothesized that a person's learning style influences the initial selection of a profession and is accentuated as one learns the profession's norms. Schmeck (1982) stated, "a learning style is a predisposition on the part of some students to adopt the same learning strategy regardless of the specific demands of the learning task" (p. 94). Kolb identified four types of learning styles: converger, diverger, assimilator and accommodator (Coker, 2000; Fox, 1984). Converger describes a person good at finding practical uses for ideas and theories. The converger is a first-rate problem solver and prefers technical tasks and problem solving to interpersonal relationships. The diverger is excellent at viewing

situations from many angles and prefers to observe and gather information prior to taking action. An assimilator is one who is able to grasp a wide range of information and organize it into concise logical formats. The assimilator is also interested in abstract ideas and concepts. The last type of learning style is the accommodator. Unlike the assimilator, the accommodator enjoys hands-on experiences, responds or takes action on his or her own "gut" feeling or instinct and tends to rely on people rather than analysis (Coker, 2000; Fox, 1984).

Identifying and understanding student learning styles can result in a reduction of unproductive instructional time due to uninvolved learners and/or poor teacher preparation (Lockhart & Schmeck, 1983). Holley and Jenkins (1993) found that students' various learning styles, regardless of teaching methods, had significant impact on all examinations, with the exception of the multiple-choice quantitative format. Even though educational psychologists maintain that teachers should acknowledge and accommodate student individuality, few teachers respond accordingly (Lockhart & Schmeck, 1983). The challenge, then, is to aid teachers by streamlining the process of determining and accommodating student learner individuality.

An educator who identifies and understands the learning styles of his or her students has an advantage in developing more effective curricular and course lessons prior to the beginning of a semester. For over 30 years, researchers in education have pointed to the significant relationship between academic success and student learning style preference (Dwyer, 1998). In 1983, Lockhart and Schmeck demonstrated the value of taking student learning styles into consideration when designing and/or revising a course. "Casual path analysis revealed relationships between certain evaluation

components and certain learning styles” (Lockhart & Schmeck, 1983, p. 94). These results support the validity of learning style constructs and suggest that learning style measures can be useful for instructors who want to take student individuality into account when designing and/or revising a course. Lockhart and Schmeck’s (1983) research provides a good argument for the use of learning style measures in selective admission programs like CAAHEP accredited entry-level ATEPs. Additional research (Fox, 1984; Griggs, Griggs, Dunn, & Ingham, 1994; Holley & Jenkins, 1993; Newstead, 1992) supports the educational benefits for students and instructors when a learning style prescription format is applied in an educational setting. In accordance with this research, an ATEP can implement instructional delivery methods based on students’ learning style needs.

Lockhart and Schmeck (1983) pointed out that even though education researchers maintain that teachers should acknowledge and accommodate students’ learning styles, very few teachers respond. Educators who do not respond by implementing these strategies into their teaching often cite lack of adequate time and resources to implement learning style characteristic strategies into the classroom. The fact that only four articles were identified that directly researched this topic in athletic training could suggest that athletic training education is consistent in regard to the research of Lockhart and Schmeck (1983). Athletic training educators are not responding to or are failing to implement the appropriate educational strategies or changes according to learning style research.

Previous research combined with the education reform now taking place in athletic training education demonstrates the need for further research on learning style

characteristics of athletic training students. To better develop curriculum and formal classroom and clinical instruction, the athletic training educator would benefit by identifying and understanding the learning style characteristics of both pre-admission and senior students. The CAAHEP requires competitive admission guidelines for ATEPs seeking accreditation, which could allow programs to incorporate a learning style assessment as part of the competitive admission requirement. The assessment of learning styles would enhance the instructional and clinical education experiences provided to students in the ATEP. Lockhart and Schmeck's (1983) results support and suggest that learning style measures can be useful for instructors who want to take student individuality into account in course instruction. The requirement for completion of a learning style inventory (LSI) as part of the application process may help ensure a better quality of instruction for the incoming class of students.

The use of the LSI as a weighted criterion for screening applicants is not justified, but the information gained about the students' learning style from the requirement to complete the LSI during the application process is supported by the literature (Griggs, et al., 1994; Holley & Jenkins, 1993; Lockhart & Schmeck, 1983). The justification for weighted criteria however, will not be known until data can be collected on LSI information from pre-admission students, therefore this research may provide a possible gateway for future research.

Aaron and Skakun's (1999) research, which administered the Approaches and Study Skills Inventory (ASSIST) to medical students, found higher surface-learning scores correlated significantly with younger age students with higher grade point averages. The surface learning style in the ASSIST is identified as a learner who

memorizes lists of superficial knowledge. Aaron and Skakun (1999) “speculated that the application of well-defined admission criteria may be creating a learning environment for premedical students that leads to the younger students being more likely than their older colleagues to rely on surface learning”(p. 74). The competitive admissions’ processes and prerequisites of an ATEP may have a similar impact. The limited research on learning styles both in the profession of athletic training and on the impact of pre-admission criteria on learning styles shows a need for further study of learning styles in athletic training education. Identification and understanding of learning style characteristics should also benefit the student by optimizing his or her learning experiences. Athletic training students, who are provided a learning environment that is more conducive to their learning style, should become more involved, interested, and ultimately better trained professionals.

The impact of the athletic training education program on learning styles can be measured by testing two groups of athletic training students, those applying for admission to the program and those with senior standing in the ATEP. If there is an even distribution of learning styles among pre-admission students, while a distinct pattern specific to one or two learning styles is found among senior students, then one may consider the possibility that certain learning styles are more suited to the profession of athletic training. In addition, the ATEP faculty, could then minimize its instructional preparation and delivery time by constructing lessons for maximum educational benefit of the students. The selective admission process of CAAHEP creates an area for needed study with respect to use of a LSI as part of the admission procedure.

Purpose of Study

The purpose of this study was to identify and compare the learning style characteristics of pre-admission and senior students in CAAHEP accredited entry-level athletic training education programs.

Significance of Research

Among allied health professions, athletic training has the least research on learning style characteristics; while similar allied health professionals such as nurses, physician assistants, and medical students have been studied (Aaron & Skakun, 1999; Draper, 1989; Fox, 1984; Harrelson, et al., 1998). Medical schools have used research on learning styles extensively to develop and enhance curricular and clinical education models (Aaron & Skakun, 1999). The research of Harrelson, et al. (1998) and Draper (1989) concerning the evaluation of learning style characteristics in athletic training students substantiates a need for further research in this area. The previous research demonstrated that teaching to a student's learning style will enhance the student's ability to learn and apply clinical skills (Coker, 2000; Draper, 1989; Harrelson, et al., 1998; Lockhart & Schmeck, 1983). This previous research provided a strong rationale for the investigation of learning styles among athletic training students.

This study provides a foundation for extensive and comprehensive studies in the learning style characteristics of students enrolled in ATEPs. Research in this area can lead to the customization of the curriculum, classroom, and clinical instruction to the needs of students in order to ensure a quality education for future athletic training students. This move to a student-centered educational model may require athletic training educators and athletic trainers to rethink their traditional instructional methods.

By doing so, ATS will be presented material in a non-threatening and familiar pattern allowing the education environment to be positive and enhance their academic growth. Instruction directed towards one's learning style will make the learning environment more comfortable. The incorporation of instructional activities including discussions, brainstorming, reflective thinking and critical thinking would improve athletic training students' classroom experiences as these types of activities incorporate and reach most learning styles in a single activity (Coker, 2000). The incorporation of simulations, case studies and hands-on experiences should be used to maximize the learning opportunities for students in the clinical setting, which incorporate something for each student's learning style (Coker, 2000). The evaluation of pre-admission students would provide instructors in the program with critical information, which would enable them to determine appropriate classroom strategies and activities to utilize with their students. The implication for developing an athletic training student class profile for instructors to utilize in lesson planning may result. The ATS in the clinical setting benefits from a clinical instructor who designs the educational experience in a format or method that will maximize the student's learning.

Hypotheses

The following hypotheses were tested at the $\alpha = .05$ significance level:

1. No significant difference between the pattern of learning style characteristics of pre-admission and senior students in CAAHEP accredited entry-level ATEPs will exist.
2. Senior students who are in CAAHEP programs are more likely to have a pattern that is composed of primarily converger and diverger learning styles rather than the

accommodator and assimilator pattern of the pre-admission students. The null version of this was tested.

3. No significant difference between the pattern of learning style characteristics of female and male pre-admission and senior athletic training students will exist.

Assumptions

The following assumptions guided this research:

1. All participants taking the learning styles inventory at the time of data collection answered the Kolb LSI IIA truthfully.
2. All participants understood the directions and completed the learning style inventory to the best of their ability.
3. All participants asked for directions and assistance from the proctor when confused or unsure.
4. The learning style inventory, Kolb LSI-IIa, accurately assessed athletic training students' learning style characteristics.

Limitations

The following are limitations that were identified by the researcher:

1. The admission standards for each CAAHEP ATEP are set by each individual program and are not standardized.
2. CAAHEP programs are found in all levels of four-year institutions from small private liberal arts colleges to Carnegie I research institutions; the students' academic abilities may vary from institution to institution.

Delimitations

The following delimitations were identified:

1. The participants in the study were geographically limited to 15 CAAHEP accredited athletic training institutions located in Districts 4 and 9 of the National Athletic Trainers Association.
2. The Kolb LSI-IIa Learning Style Inventory was used to assess learning style characteristics of students enrolled in CAAHEP accredited ATEPs.
3. Participants were limited to pre-admission and senior athletic training students.

Definitions of Terms

For the purpose of this investigation, the following terms are defined:

1. Athletic Training Education Program (ATEP): An educational program housed in a four-year college or university that has been accredited by CAAHEP (Commission on Accreditation, 2003a).
2. Athletic Training Student (ATS): Any student enrolled in a four-year university or college who is enrolled in a CAAHEP accredited athletic training education program (National Athletic Trainers' Association, 2001).
3. Certified Athletic Trainer (ATC): An individual who has fulfilled the requirements for certification established by the NATABOC (National Athletic Trainers' Association, 2003).
4. Communication Apprehension: "the fear or anxiety associated with real or anticipated communication with another person or persons" (Dwyer, 1998 p. 138).

5. Commission on Accreditation of Allied Health Education Programs (CAAHEP): A non-profit allied health education organization whose purpose is to accredit entry-level allied health education programs. This includes ATEPs and 20 other allied health profession programs (Commission on Accreditation, 2003b).
6. Joint Review Committee for Educational Programs in Athletic Training (JRC-AT): A committee that evaluates and makes a recommendation to CAAHEP for consideration of program accreditation status.
7. Learning Style Inventory (LSI): An instrument used to identify the learning style of a particular individual, usually a Likert scale questionnaire (Coker, 2000; Fox, 1984).
8. National Athletic Trainers' Association (NATA): The professional organization for certified athletic trainers' that provides the ethics, morals, and guidelines for professional practice (National Athletic Trainers' Association, 2003).
9. National Athletic Trainers' Association Board of Certification (NATABOC): The independent agency that certifies athletic trainers and assures all consumers that certified athletic trainers have passed the certification examination and successfully meet the continuing education requirements (Cagle, 2001).
10. Pre-Admission Athletic Training Student: Any student enrolled in a four-year university or college who is seeking to gain admission into the school's CAAHEP accredited athletic training education program

11. Senior Athletic Training Student: Any student who has successfully fulfilled the requirements for admission into a CAAHEP accredited athletic training education program (ATEP) and has completed the necessary courses and clinical experiences to be classified as a senior in the ATEP.

CHAPTER II

Review of Literature

Learning styles have been a source of much exploration and analysis in various allied health and non-allied health fields. However, research on learning styles in athletic training is limited. This chapter provides a review of the literature related to learning styles and learning styles in athletic training education.

Learning Styles

The incorporation of teaching strategies that accommodate an individual learning style has resulted in consistent, significant improvement of student performance in the traditional classroom setting (Coker, 2000). The majority of research on learning styles has been on students in allied health and medical professions with nursing being studied most frequently (Harrelson, et al., 1998). Congruency between studies has often been compared with the various definitions of learning styles used by researchers. Schmeck (1982) stated that a learning style is a predisposition on the part of some students to adopt the same learning strategy regardless of the specific demands of the learning task. Schmeck's (1982) premise was that the subject matter or the type of test did not influence the strategy used in the learning material.

Learning styles, which can be divided into four groups, relate to general strategies used to aid learning. Kolb's (1985) learning style evaluator identifies the following four styles: a) Divergers, b) Accommodators, c) Convergors, and d) Assimilators. Divergers

are best at viewing concrete situations from many different points of view and tend to observe a situation and then take action. Accommodators have the ability to learn primarily from “hands-on” and tactile experiences, while acting on their gut feelings rather than on logical analysis. Convergers are best at finding practical uses for ideas and theories. In addition, convergers have the ability to solve problems and make decisions based on finding solutions to questions or problems. Assimilators are best at understanding a wide range of information and putting that information into a concise, logical form; they tend to ensure that a theory is logically sound, rather than practical.

Kolb’s learning style patterns differ from others in that his theory was developed from experiential learning theory (Claxton, & Murrell, 1987). Kolb’s theory deals with learning style and with the more basic question of learning and individual development (Claxton & Murrell, 1987). Experiential learning theory is a four-step process where learners have immediate concrete experience from which reflective observations are made and abstract conceptualization is performed integrating the observations into sound theories. This cyclic process leads to generalizations or theories that are used as guides to future actions in more complex situations and continue to be redeveloped and defined in a process known as active experimentation (Claxton & Murrell, 1987).

Siegel and Siegel described a cognitive style called educational set (as cited in Claxton & Murrell, 1987). This is a continuum, which ranges from a preference for factually oriented material to a preference for conceptually oriented material. A conceptual set includes facts as elements to be interwoven into a broader contextual concept, while a factual set is one where the facts are interlaced into a more complex framework (Claxton & Murrell, 1987).

The Schmeck Model of learning styles is defined as a predisposition on the part of a student to adopt a particular learning strategy regardless of the specific demands of the learning task (Claxton & Murrell, 1987). Brower et al. (2001) stated that people possess and use unique approaches to learn; these approaches are commonly referred to as learning styles. Markert (1986) identified learning style as the method an individual uses to obtain and then apply information.

The ability to recognize and adapt to students' learning styles is critical if research on learning styles is to be beneficial. Griggs and Dunn (1984) stated that everyone has a learning style and this is observable within a typical classroom. Griggs and Dunn (1984) studied learning styles of gifted and talented students and discussed selected case studies describing the students' characteristics. Furthermore, the Griggs and Dunn (1984) review of case studies demonstrates that a significant improvement in academic achievement is attained when students' learning style preferences are accommodated through complimentary teaching styles, instructional approaches, and/or resources.

While studying the learning styles of medical students, Curry (1999) discussed three different layers of cognitive styles and their roles in medical school education. The three layers of cognitive styles are: a) level one is the cognitive personality style, which is the individual's approach to adapting to and assimilating information, b) level two is the information processing style, which is the active underlying factor in educational choices of learners and the mediator between the first and third levels, and c) level three refers to the individual's choice of an environment in which to learn (Fox, 1984). Curry (1999) noted that if the physical and social environment is congruent with a student's affective style, then a student will be more likely to learn if the mode of teaching matches the

student's learning style. Curry (1999) also noted that a key to educational and professional success is the ability to adapt to different situations, which includes adapting one's learning style. Learners or practitioners who demonstrate stress or failure may lack this flexibility and have difficulty adjusting (Curry, 1999). "Curry describes Kolb's theory of experiential learning and learning styles as one of the prominent theories of the information processing style" (Fox, 1984, p. 72). Athletic training students are expected to improvise, adapt and overcome a myriad of factors during an injury assessment making Curry's (1999) research a factor to consider in athletic training education.

The study of learning styles and the implementation of learning style strategies often increases a student's performance and chance of success. Students who follow a learning style prescription tend to have higher grade point averages (GPAs) and higher test performances (Busato, Prins, Elshout, & Hamaker, 1998). Vermunt (1998) indicated that an undirected learning style method of instruction was a negative predictor of academic success. Research on how university students learn has been applied to freshman students (Busato, et al., 1998). Most students, especially first-year psychology students, are obliged to participate in experiments (Lockhart & Schmeck, 1983). Aaron and Skakun (1999) and Lockhart and Schmeck (1983) cited research which evaluated whether students' learning styles change during matriculation through college and whether students choose their area of study based on professors' learning styles or teaching styles. Allied health professions have not answered these questions (Fuller, 1997).

Dwyer (1998) evaluated the relationship between communication apprehension and learning style preferences. The purpose of Dwyer's (1998) study was to investigate

the relationship between communication apprehension and learning style preference in an effort to describe the learning style of those who are high communication apprehensive (HCA) to design more appropriate teaching strategies. Communication apprehension is the fear or anxiety associated with the actual or anticipated communication with another person or persons (Dwyer, 1998). Dwyer (1998) found a student's academic achievement was enhanced when the student's learning style was considered when designing lesson plans or instructional strategies. Dwyer's (1998) study illustrated the importance of discovering the relationship between communication apprehension and learning style. Communication apprehension may be a factor that needs to be evaluated or accounted for in clinical education in athletic training. In addition, there was a decline in student academic performance when his/her classes were taught primarily in less preferred learning styles. A student's academic achievement is enhanced when a student's learning style is considered.

Learning Style Inventory Evaluation/Assessment

Learning style research has developed various learning style instruments or LSIs. Fuller (1997) stated that valid educational instruments may help an educator design learning objectives, assignments and examinations. The literature provides strong measures of LSI reliability, but several questions concerning the validity of LSIs are apparent. In order to further substantiate the value of the LSI in educational design, the relationship between learning style as indicated by the LSI and learners' instructional preferences for different education methods within a specific context should be studied.

The Productivity Environmental Preference Survey (PEPS) LSI is a computerized version of the LSI paper and pencil tests. The PEPS contains 100 questions and provides

subscale summaries on 20 factors (Billings, 1991). Billings (1991) noted that the computerized version allows for easier testing of much larger populations, especially if made accessible from a web site. The computerized method is a convenient and practical method for assessing students' individual learning styles (Billings, 1991). The Internet will have a future impact on LSI assessment, as the Internet becomes more integrated into daily life.

Green, Snell, and Parimanath (1990) investigated the viability of using the LSI to predict group learning style. Their sample included 147 community college students. Students enrolled in six different social science classes were administered Kolb's LSI. Academic major, accommodating interest, science interest, and numerical aptitude significantly contributed to students' learning styles. Green, et al. (1990) concluded that including a learning style inventory as part of a pre-assessment package for entering students can provide valuable information for students in making choices of academic goals and careers. Green et al. (1990) provided a basis for use of LSIs on pre-admission students and senior students in CAAHEP programs. If significant differences are found in the patterns, then the use of an LSI as a component of the selective admission processes may be warranted.

Fox (1984) measured two variables of learning style to directly assess the construct validity of an LSI. Fox (1984) indicated learning style by scoring the LSI and associating these scores with the appropriate quadrant of the learning style (LS) matrix and its categorical definition. The evaluative statements in this study were based on Kolb's (1985) learning style descriptors. The Fox (1984) study provided support for the reliability and validity of Kolb's LSI when directly related to health professionals.

Brower, et al. (2001) found the Kolb LSI to be the most frequently used instrument for identifying learning styles for adults. The Kolb LSI is used extensively in learning style research with the initial version created in 1976, and revisions completed in 1985 and 1993 (Brower, et al., 2001).

Learning Style Assessment of Allied Health Professionals

The literature has been inconclusive in citing a primary, dominant, learning style preference among medical students, nursing students, and/or other allied health care students. The literature does support the proposal that the identification of learning style type helps students in programs and allows for higher quality lesson and test development by educators (Curry, 1999; Fox, 1984; Lockhart & Schmeck, 1983).

Research on learning styles of students is a relatively new area of inquiry, with the majority of the initial studies being conducted in the 1980s. "Students in allied health and medical professions have been the most common subjects in learning style investigations, with nursing students studied most frequently" (Harrelson, et al., 1998, p. 50). Learning style research conducted on the allied health care population was primarily conducted with the Learning Style Inventory (LSI) developed by Kolb, known as the Kolb LSI (Draper, 1989; Harrelson, et al., 1998).

Another form of learning style assessment is the prescription format. The learning style prescription format was found consistently in the literature regarding other allied health care professions' educational programs (Draper, 1989; Fuller, 1997). The first step in determining a learning style prescription for athletic training education students and faculty is to identify the learning style characteristics of a student athletic trainer. Other comparable professions that have already studied the learning styles of

students include nursing, physical therapy, paramedics, and occupational therapy. The literature drawn from these groups provides an evaluation of learning style characteristics in both classroom education and clinical education environments (Fuller, 1997; Harrelson, et al., 1998).

Aaron and Skakun (1999) studied learning styles of Alberta Medical School students using the Approaches and Study Skills Inventory (ASSIST). Aaron and Skakun (1999) investigated the relationship between learning styles and admission data for an incoming class of medical students. Aaron and Skakun (1999) hypothesized some characteristics of the students or their premedical experience may be responsible for the correlation observed between age and the surface learning style. The surface learner memorizes lists of superficial knowledge, while a strategic learner focuses on assessment, and a deep learner searches for understanding and comprehension (Aaron & Skakun, 1999). The researchers thought something in the application or admission criteria was creating a learning environment more hospitable to younger students who tend to be surface learners.

An independent factor analysis confirmed the validity of the three-factor solution of the ASSIST. A significant ($p < .05$) negative association of surface learning with years of previous university study before entry to medical school was found (Aaron & Skakun, 1999). In addition, a statistically significant correlation between GPA and surface learning in the group with more than four years of university study was found ($p < .05$). Aaron and Skakun (1999) confirmed the correlation between surface learning and GPA in prerequisite courses, particularly in older students.

The LSI, Your Style of Learning and Thinking (SOLAT), and Fieldwork Performance Reports (FOPS) were used by Stafford (1986) to assess the relationship between learning styles and clinical performance of 33 occupational therapy students. Stafford (1986) concluded that further research is needed to assess learning styles as predictors of clinical performance and as guides for curriculum design. Stafford's findings support the need for investigation of pre- and post-admission students of a CAAHEP program to identify a common trend or difference, which if found to exist, could be used to enhance instructional outcomes and lessons for clinical and classroom work.

Learning Styles and Athletic Training Education

For over 30 years, researchers in education have pointed to the significant relationship between academic success and student learning style preference (Dwyer, 1998). Only four published studies regarding the evaluation of learning styles of undergraduate athletic training students were found (Brower, et al., 2001; Coker, 2000; Draper, 1989; Harrelson, et al., 1998). The fact that only four studies were found in this field is surprising and shows a need for more investigation in this area of athletic training education (Dwyer, 1998). Harrelson, et al. (1998) identified the need to assess the learning styles of students enrolled in a CAAHEP accredited undergraduate ATEPs. The Kolb LSI was the instrument used in the athletic training research articles on learning styles (Harrelson, et al., 1998).

Harrelson et al. (1998) found that undergraduate athletic training students function best as learners in a well-lit environment, and that they prefer afternoon as the optimal time for learning. In addition, Harrelson, et al. (1998) did not find a clear

preference for kinesthetic and tactile learning experiences among the athletic training students in their study. These findings are somewhat surprising since the desire for hands-on learning activities is strongly associated with all types of allied health professional students and medical students. These findings are in direct contrast to Draper (1989), who found 60% of the respondents classified as kinesthetic learners. Draper (1989) used Babich and Randol's Learning Styles Inventory, which he administered to 102 candidates taking the NATA certification examination. Coker (2000) felt if learning styles are to be considered when designing ATEP curriculums, the validity of the resulting learning style profile must provide the respondent with a specific focus, either that of a classroom or a clinical setting prior to completing the inventory. Coker (2000) found that 58% of 26 respondents' learning styles changed according to setting focus.

Lockhart and Schmeck (1983) demonstrated the value of taking student learning styles into consideration when designing and revising a course. Casual path analyses revealed relationships between certain evaluation components and certain learning styles. The Lockhart and Schmeck (1983) results support the validity of the learning style constructs. These researchers suggested that learning style measures can be useful for instructors who take student individuality into account when designing and revising a course. Applied to athletic training education, this research provides a good argument for selective admission to CAAHEP accredited programs. A curriculum based on student learning style needs, if a characteristic learning style pattern can be identified, can help to identify appropriate students to admit to the program. In addition, lesson plans and classroom activities can be structured for optimal student performance.

Brower et al. (2001) found no significant difference existed between the observed and expected distribution of learning styles for those admitted and not admitted to an ATEP. In addition no significant difference existed between the learning style distributions of the groups when compared to each other. Brower et al. (2001) concluded that learning styles could be easily identified through the use of the Kolb LSI-IIa, but that no dominant learning style among undergraduate athletic training students and no particular learning style led to program admission. Brower et al. (2001) found that learning style has influenced other measures of academic performance in other fields. Nursing students categorized as Assimilators have higher GPAs than their counterparts in other learning style classifications and medical students classified as convergers perform better on objective examinations.

Coker (2000) examined the learning styles of undergraduate athletic training students to determine their consistency in the traditional classroom setting versus clinical rotation. Coker's (2000) subjects completed the LSI twice, once focusing on learning new information in the classroom and the other on learning new information in the clinical rotation. Coker (2000) observed a significant difference between the Reflective Observation and Active Experimentation modes across settings. In addition, 58% of the respondents' learning styles changed according to setting. Coker (2000) recommended that athletic training educators administer the LSI twice to determine an individual's cognitive and experimental learning style profiles. Testing twice allows the educator to shift instructional techniques and strategies used in each setting. Coker's (2000) study is based in part on Kolb's Experiential Learning Theory, which states a well-rounded learning process involves the use of all four learning modes. This theory assumes that

people are capable of learning through all four learning styles and that they have a dominant and secondary learning mode that they apply everyday.

Fuller (1997) evaluated whether or not undergraduate athletic training educators are writing learning objectives that foster critical thinking (CT) skills and whether written assignments and written examinations are measuring the extent to which students have developed CT skills. The four upper levels of Bloom's taxonomy of the cognitive domain represented CT in Fuller's (1997) study. The manner in which objectives and exams are written may enable certain learning styles to prevail. In addition, writing objectives in differing forms may assist students in learning to adapt the weaknesses of their learning styles when learning. By knowing LS characteristics prior to syllabus construction in college courses, CT could be better fostered according to Fuller (1997). The study suggests that learning occurs as a result of well-written and followed lesson plans rather than a learning style prescription being implemented. Fuller (1997) suggested valid educational instruments may help educators design learning objectives, assignments and examinations. Student successes must then be either a result of learning style instruction or well-designed lesson plans.

The literature lacks evidence for or against the use of learning style inventories in athletic training education (Brower, et al., 2001; Coker, 2000; Draper, 1989; Harrelson, et al., 1998). Harrelson, et al. (1998) stated further research is needed to investigate the relationship between learning and teaching styles and educational outcomes. Brower, et al. (2001), Draper (1989), and Harrelson, (1997) would appear to be in direct conflict with Lockhart and Schmeck (1983), who provide support for use of learning style inventories in pre-admission packets. Draper's (1989) research showed academic

variables rather than learning styles were considered predictors of NATABOC examinees. Harrelson, (1997) verified Draper's findings, suggesting that academic variables are more valuable in pre-admission criteria than learning style assessment. Four studies with conflicting results are, however, insufficient to draw any conclusions.

Summary

Athletic training education will need effective and proven educational strategies to use in the new millennium of athletic training education. The knowledge gained by the instructor about the learning style of his or her student could be invaluable if used correctly. The literature provides a considerable amount of evidence that the implementation of learning style prescription in a lesson, course, or program could be invaluable to the student and the educator. Although allied health care professions are the most frequently studied groups with respect to learning style evaluations, athletic training, an allied health care profession since 1992, needs to do more research in this area of education. This additional research could provide useful direction to ATEP instructors.

Coker (2000) recommended that athletic training educators administer the LSI twice to determine an individual's cognitive and experimental learning style profiles. Educators could then shift instructional techniques and strategies used in each setting to match that of the students. Curry (1999) noted that a key to education and professional success is the ability to adapt to different situations, which includes adapting one's learning style. Learners or practitioners who demonstrate stress or failure may lack this flexibility and have difficulty adjusting. Green, et al. (1990) concluded that including a learning styles inventory as part of a pre-assessment package for entering students can

provide valuable information for students in making choices of academic goals and careers. Research by Harrelson et al. (1998) provides justification for evaluating learning styles of students both pre-admission and post-admission. This research shows that without a sense of the learning style characteristics pre- and post-admission, an adequate predictive model cannot be developed for learning preferences among athletic training students.

CHAPTER III

Methods

The purpose of this investigation was to identify and compare the differences in learning styles between pre-admission and senior students of CAAHEP accredited athletic training education programs. In this chapter, the pilot study, study design, instrumentation, and data analysis procedures used in this study are presented.

Pilot Study

A pilot study was conducted to test the design and procedures utilized to conduct the research. The pilot study consisted of 20 ($N = 20$; $m = 13$; $f = 7$) athletic training students, 10 pre-program admission and 10 admitted students in a JRC-AT Candidacy Status athletic training education program. The mean age of the athletic training students was 22.33 ± 6.23 with two respondents not reporting their age. The mean cumulative GPA was $3.16 \pm .69$. The level of significance was set at $p < .05$.

A chi square analysis was used and no significant difference was found in the learning styles of pre-admitted and admitted students. Descriptive statistics showed an almost even distribution of the four learning style characteristics with 20% Assimilators, 25% Accommodators, 20% Divergers, and 35% Convergents. Similar distribution was seen when looking across gender. No significant difference was found by gender with the chi square analysis. The lack of significant differences in the pilot study may be a direct result of the small sample. The pilot study data did, however, lead to the

recommendation that only senior athletic training students be assessed to ensure students with the same level of education and training were being compared, since CAAHEP ATEPs may vary their programs from two to four year programs. The senior level student, however, would be a constant.

Power Analysis

The small sample size of the pilot was consistent with previous research total sample sizes in studies on learning styles of athletic training students enrolled in ATEP, Harrelson, et al. (1998) N = 27 and Coker (2000) N = 20. Coker (2000) and Harrelson, et al. (1998) did not report whether the sample sizes were samples of convenience or if a power analysis was conducted. A power analysis was conducted to determine minimum sample size for the current study using G*Power (Erdfelder, Faul, & Buchner, 1996). The power analysis was conducted for chi square with 9 df, the largest of the three hypotheses to be tested. The effect size was set at 0.5, since previous research did not provide a reference; however, Cohen (1969) provides a basis for small (0.2), medium (0.5), and large (0.8) effect sizes for a priori power analysis for determining sample size. The 0.5 was selected to assure if an effect was found that the measure would be visible. While one might be tempted to set the clinically significant effect at a small value to ensure high power for even a small effect, this determination cannot be made in isolation. One should consider previous research in the field (Cohen, 1969; Cohen 1988). The selection of an effect size reflects the need for balance between the size of the effect that can be detected, and the resources available for a study (Cohen, 1988). The G*Power (Erdfelder, et al., 1996) calculated a minimum N = 95, with $\alpha = 0.05$, effect size = 0.5, and df = 9.

Design

There were 62 CAAHEP accredited programs in District 9 (AL, FL, GA, KY, LA, MS, TN, Puerto Rico, and Virgin Islands) and District 4 (IL, IN, MI, MN, OH, WI, Manitoba, and Ontario) of the NATA. An initial letter (Appendix A) was sent to all ATEP directors in District 9 and District 4 of the NATA asking if they were willing to permit their students to participate in this study. The program directors were asked to complete and return a willingness to participate agreement or declination form (Appendix A) by January 31, 2003 to the researcher. Each returned participation agreement was coded with a number for identification upon return. A follow-up telephone call and electronic mail were made to program directors who did not respond to the initial letter. After waiting one week for additional responses, a random numbers' table was used to select 15 CAAHEP accredited programs to participate from the returned willingness to participate agreements.

Contact was then made with the randomly identified 15 athletic training education programs by a formal letter (Appendix B) with a self-addressed stamped card to respond. Follow-up electronic mail and telephone calls were directed to the ATEP directors that did not respond to the initial letter of selection for participation in the study. The failure of a program director to respond in one week to these follow-up methods or a program director's withdrawal from participation at this point resulted in the selection of another ATEP. This selection was made from the respondent pool generated from the initial contact letter minus the programs already accepted using a random numbers' table. The program directors from the 15 programs were asked to recruit 10 students from their pre-admission students and 10 graduating senior students to participate in this research

project. During the process of coordinating on-site visits to collect data, 4 selected programs dropped out of the study citing institutional review board conflicts. After the participants were identified, the researcher scheduled a time to visit each campus and administer the Kolb LSI-IIa inventory with the ATEP directors, but 2 programs failed to confirm visit dates and times. The final number of CAAHEP entry-level ATEPs participating in the study was 9. In addition, not all programs had 10 pre-admission or 10 senior ATS so the total number each program had was used but did not exceed 10 for either group. The number of participants consisted of 63 pre-admission and 73 senior students for a total $N = 136$ valid participants. The $N = 136$ exceeds the minimum sample size of 95 needed as determined by the power analysis.

Description of Participants

The participants in this study were all college students attending a four-year college or university with a CAAHEP accredited athletic training education program. Sixty were seeking admission to the ATEP and 71 were graduating senior students with one student failing to indicate class standing and four failing to complete the Kolb LSI IIa correctly. All participants were 18 years of age or older. To be included in the study, participants must have been currently enrolled in a four-year college or university and be in the pre-admission phase or a senior athletic training student in the ATEP. Participants were excluded from the study if they were not currently enrolled in an ATEP, failed to correctly complete the consent form (Appendix C), properly answer question number five and eight on the demographical data sheet (Appendix E), or the Kolb (1985) LSI-IIa instrument (Appendix D).

Recruitment

The 15 (43%) CAAHEP accredited ATEPs were selected at random from a pool of 35 (56%) CAAHEP ATEPs in Districts 9 and 4 of the NATA who stated they were willing to participate out of a total of 62 programs. The participants were recruited by the athletic training education program director at 9 (26%) of the 15 randomly selected institutions. The ATEP directors were asked to randomly select 10 pre-admission students and 10 senior athletic training students to participate in the study.

Informed Consent

All participants were asked to sign an informed consent form prior to participating in the study (Appendix C). The informed consent was presented first to the subjects in the packet during the administration of the LSI at the participants' school by the researcher. The participants were asked to read, review, and sign the informed consent form and keep the second copy in the packet, signed by the researcher, for their records. The informed consent assured the participants' confidentiality and voluntary participation in the study. The Institutional Review Board (IRB) at Middle Tennessee State University (Appendix H) and each institution's IRB approved this study prior to the data collection. The researcher collected informed consent forms after the participants read and signed them.

Data Collection Procedures

Upon arrival at the institution, the researcher inspected the facility or classroom where the Kolb LSI-IIa was administered to assure that there were no significant problems that might interfere with completion of the survey, i.e. poor lighting, temperature control, or noise. When the participants assembled at the specified meeting time and place, the purpose of the research study was explained to all the participants and

the participants were reminded that participation was voluntary and that they could withdraw from the study at any time. The participants were given a research packet which included: a) two consent forms (Appendix C) which provided a brief explanation of the study, confidentiality issues, and the right to withdraw from the study at anytime; b) demographic questionnaire (Appendix E), and c) the Kolb LSI-IIa inventory (Appendix D). The researcher read the scripted instructions (Appendix F) and had the participants complete the Kolb (1985) LSI-IIa (Appendix D) and demographic data collection form (Appendix E). After the participants complete the research packet and the Kolb (1985) LSI-IIa, they turned in all the forms except their copy of the informed consent form to the researcher.

Description of Instrumentation

The Kolb LSI is a standardized instrument that has been used by educators and psychologists since the 1980s to assess learning styles of adult-age individuals. The Kolb LSI-IIa instrument (Appendix D) consists of a series of 12 short sentence sets that the participant must finish in one of four ways using a four point Likert-scale to mark in the spaces below the letters "A", "B", "C", or "D" on the provided score sheet (Appendix G). The participant responded with the number 1, 2, 3, or 4 after reading the beginning sentence statement for each of the four sentence sets. The Kolb LSI-IIa (Appendix D) took an estimated 30 minutes to complete. The demographic data collection form (Appendix E) consisted of 25 questions related to various information used to evaluate outside factors that may affect a student's learning style, i.e. number of credit hours completed and gender. Other demographics included race, year in program, semesters completed, and age.

Data Analysis Procedures

The Kolb (1985) LSI-IIa was scored individually to find the learning style characteristics of each participant. Hay/McBer, the distributor of the inventory supplied scoring directions for the questionnaire. The participants' responses from their answer sheet (Appendix D) were transferred to the Kolb (1985) LSI-IIa score sheet (Appendix G) and totaled by an independent scorer. The results of the participants' responses on the Kolb LSI-IIa were then categorized into four learning mode scores: Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE). These totals were then used to calculate plot points on the Learning-Style Type Grid (Appendix G). The scores for the four learning modes AC, CE, AE, and RO were then subtracted in the following sequence: $AC - CE =$ Abstract Conceptualization-Concrete Experience score (AC-CE Score) and $AE - RO =$ Active Experimentation-Reflective Observation score (AE-RO Score). The combination scores were plotted on the Learning-Style Type Grid (Appendix G). The Learning-Style Type Grid is divided into four quadrants labeled as Accommodator, Diverger, Converger, and Assimilator. The AC-CE and AE-RO scores' points of interception or data points fell in the quadrant of the preferred learning style for the participant being scored. The preferred learning style of the participant was identified and recorded by the independent scorer.

The results from the Kolb LSI-IIa score sheet (Appendix G) were analyzed with the results of the demographic data (Appendix E) using SPSS (2000) to determine if any differences in learning style characteristics of pre-admission and senior students could be identified. The dependent variables in this design were the number of learning styles

present and the type of learning styles of pre-admission and senior students in CAAHEP entry-level ATEPs. The independent variables in this study were pre-admission and senior students. A chi square test of association analysis was used to compare the pre-admission and senior athletic training students' learning style characteristics.

Additionally, chi square analysis was used to identify and compare the differences of learning style characteristics between male and female athletic training students. The significance level was set at $p < .05$.

CHAPTER IV

Results

The purpose of this chapter is to present the results of the data analysis performed on the data collected on the learning styles of athletic training students in CAAHEP accredited entry-level ATEPs. The results describe the learning style characteristics of pre-admission and senior standing athletic training students and determined if any significant relationship exists between learning style and student status (pre-admission versus senior). The results of the statistical analysis of the three hypotheses are provided in addition to demographic characteristics of the athletic training students in this study.

Demographic Data

Data were initially planned to be collected from 15 (43%) randomly selected CAAHEP accredited ATEPs from 35 (100%) respondent programs. Only 20 (57%) programs were willing to participate and 15 (43%) opted not to participate out of a total pool of 62 programs. During the process of coordinating on-site visits to collect data, 4 selected programs dropped out of the study citing institutional review board conflicts, while 2 programs failed to confirm visit dates and times with the researcher. As a result, only 9 (60%) of the 15 selected programs participated in the study.

The total number of athletic training student participants was 136, of which 73 were seniors and 63 were pre-admission status. They were administered the Kolb LSI Iia. A total of 131 responses were used for statistical testing due to one student failing to indicate class standing and 4 failing to complete the Kolb LSI Iia correctly. The senior

participants consisted of 24 males and 46 females and 1 not reporting gender. The pre-admission participants consisted of 20 males and 38 females with 2 not reporting gender.

The ethnicity make-up of the sample consisted of 118 *Caucasians*, 8 *African-Americans*, 4 *Other/Mixed*, and 1 *Hispanic*. For pre-admission athletic training students there were a total of 54 *Caucasians*, 4 *African-Americans*, 1 *Hispanic*, and 1 *Other/Mixed*. Senior athletic training students consisted of 64 *Caucasians*, 4 *African-Americans*, and 3 *Other/Mixed*. The participants had a mean age of 20.7 with the youngest being 18 and the oldest 37. The participants had completed a mean of 84 credit hours of college work with the minimum completed being 11 hours and the maximum being 230 hours. The mean number of college semesters complete was 5.7 with one being the minimum and 22 the maximum number completed.

Table 1

Current Cumulative Grade Point Average (GPA) Ranges as Reported by all Participants

GPA	Frequency of N ^a Reporting	N ^a (%) Reporting
0 to 1.4	1	.7
1.5 to 2.4	12	9.1
2.5 to 3.4	72	54.9
3.5 or >	46	35.1
Total N ^a	131	100.0 ^b

^a This refers to the total number of participants in the study with all participants reporting this information and no missing data.

^b Note the above totals do not add to 100% due to table column only showing the percentage to the first decimal place

Table 2

Additional Demographic Statistics as Reported by all Participants

	Gender				Avg. Semester/Qtr. Hrs Completed
	M	F	NR ^a	Total	
Pre-Admission	20	38	2	60	34
Seniors	24	46	1	71	128

^a NR refers to those of the total N who did not report gender on the demographic form within each group

Learning Style Characteristics Data Analysis

The data collected in this research focused on the learning style characteristics of pre-admission and senior athletic training students enrolled in CAAHEP accredited entry-level ATEPs. The Kolb (1985) LSI-IIa was administered to 136 athletic training students. Four instruments were completed incorrectly and could not be used. In addition one subject failed to correctly indicate whether he or she was a senior or pre-admission student. A chi square test of association analysis was performed on the data set with an

$N = 131$ for H_1 and H_2 , while $N = 128$ was used for H_3 since three individuals did not report gender.

Three major hypotheses were proposed. The null hypotheses for each were tested. The alpha was set at $\alpha = .05$ for all statistical analysis in this study. This section addresses each of three hypotheses' chi square statistical results.

H_1 (Hypothesis 1) stated: No significant difference between pattern of learning style characteristics of pre-admission and senior students in CAAHEP accredited entry-level ATEPs will exist. A chi square 4 x 2 cross tabulation (Table 3) was run with senior athletic training students and pre-admission athletic training students in rows and learning styles characteristics in columns. There was no significant difference found as $p = .124$

with chi square (3, N = 131) = 5.76 (see Table 3). This failure to reject the null H_1 , indicated statistically equivalent proportions in each style for the pre-admission versus senior students.

Table 3

$H_1 \chi^2$ Cross Tabulation of Learning Style Characteristics for Senior versus Pre-Admission Athletic Training Students

		Learning Styles from Kolb LSI-IIa				Total
		Assim ^a	Accom ^b	Diverger	Converger	
Pre-Admit	Count	11	21	19	9	60
	Expected Count	11.0	18.3	16.0	14.7	60.0
	Proportion in Each Style	18.3%	35.0%	31.7%	15.0%	100.0%
Senior	Count	13	19	16	23	71
	Expected Count	13.0	21.7	19.0	17.3	71.0
	Proportion in Each Style	18.3%	26.8%	22.5%	32.4%	100.0%
Total	Count	24	40	35	32	131
	Expected Count	24.0	40.0	35.0	32.0	131.0
	Proportion w/in Each Style	18.3%	30.5%	26.7%	24.4%	100.0%

$\chi^2 = 5.76$; $p = .124$; $df = 3$

^a Assimilator

^b Accommodator

Table 4

H_1 Chi Square Analysis

	Value	df	Asymp. Sig. (2-Sided)
Pearson χ^2	5.766 ^a	3	.124
Likelihood Ratio	5.937	3	.115
Linear-by-Linear Association	1.935	1	.164
N of Valid Cases	131		

^a 0 cells (.0%) have expected count < 5. The minimum expected count is 10.99.

H₂ indicated: Senior students who are in a CAAHEP are more likely to have a pattern that is composed of primarily converger and diverger learning styles than the accommodator and assimilator pattern of pre-admission students. The null hypothesis of no significant difference was tested. A chi square test of association indicated no significant difference in learning styles was found between pre-admission and senior ATS $\chi^2(1, N = 131) = .889, p = .346$ (Table 5 and Table 6). The learning styles were converger /diverger which were defined as having a score greater than or equal to 3 in the first column of scoring. The Assimilator/Accommodator learning styles were defined as scores less than 3 (Table 5). This null hypothesis was not rejected. Statistically equivalent proportions were found in the combined styles. Senior students were not more likely to be of the converger/diverger learning style.

Table 5

$H_2 \chi^2$ Cross Tabulation of Diverger/Converger versus Assimilator/Accommodator Styles for Senior and Pre-Admission Athletic Training Students.

		H ₂ Learning Style Groups		
		Conv/Dive	Assim/Accom	Total
Pre-Admission	Count	28	32	60
	Expected Count	30.7	29.3	60.0
	Proportion in Each Category	46.7%	53.3%	100.0%
Seniors	Count	39	32	71
	Expected Count	36.3	34.7	71.0
	Proportion in each Category	54.9%	45.1%	100.0%
Total	Count	67	64	131
	Expected Count	67.0	64.0	131.0
	Proportion in each Category	51.1%	48.9%	100.0%

$X^2 = .889$; $p = .346$; $df = 1$

0 Cells (.0%) have expected count less than 5. The minimum expected count is 29.31

Table 6

$H_2 \chi^2$ Test Results

	Value	df	Asymp. Sig (2-sided)
Pearson χ^2	.889	1	.346
Likelihood Ratio	.889	1	.346
Linear-by-Linear Association	.882	1	.348
N of Valid Cases	131		

H₃ indicated: No significant difference between the pattern of learning style characteristics of the total population of ATS between female and male pre-admission and male and female senior ATS will exist. A chi square 4 x 4 cross tabulation was conducted to determine if any significant relationship existed. No significant difference in learning styles was found $\chi^2(9, N = 128) = 13.209, p = .153$ (Table 7 and Table 8). Note that N = 128 due to 3 of the 131 participants completed the Kolb LSI Ila correctly not indicating gender. This led to a failure to reject the H₃ null hypothesis, indicating statistically equivalent proportions of males and females in each learning style.

Table 7

H₃ χ^2 Analysis Results

	Value	df	Asymp. Sig. (2 Sided)
Pearson χ^2	13.209	9	.153
Likelihood Ratio	14.689	9	.100
Linear-by-Linear Association	.013	1	.910
N of Valid Cases	128		

Table 8

$H_3 \chi^2$ Cross Tabulation Comparing Learning Styles Characteristics of Male versus Female Senior and Pre-Admission Athletic Training Students.

	Learning Styles (LS)				Total
	Assimilator	Accommodator	Diverger	Converger	
MPA ^a Count	5	5	6	4	20
Expected Count	3.6	6.1	5.3	5.0	20.0
Proportion in Ea. Style	25.0%	25.0%	30.0%	20.0%	100.0%
MS ^b Count	5	2	7	10	24
Expected Count	4.3	7.3	6.4	6.0	24.0
Proportion in Ea. Style	20.8%	8.3%	29.2%	41.7%	100.0%
FPA ^c Count	6	15	12	5	38
Expected Count	6.8	11.6	10.1	9.5	38.0
Proportion in Ea. Style	15.8%	39.5%	31.6%	13.2%	100.0%
FS ^d Count	7	17	9	13	46
Expected Count	8.3	14.0	12.2	11.5	46.0
Proportion in Ea. Style	15.2%	37.0%	19.6%	28.3%	100.0%
Total Count	23	39	34	32	128
Expected Count	23.0	39.0	34.0	32.0	128.0
Proportion in Ea. Style	18.0%	30.5%	26.6%	25.0%	100.0%

$\chi^2 = 13.209$; $p = .153$; $df = 9$

^a Pre-Admission status Males, ^b Senior standing Males, ^c Pre-Admission status Females, ^d Senior standing Females and 2 Cells (12.5%) have expected count less than 5. The minimum expected count is 3.59. None of the cells have expected count of 1 or less.

Summary

The chi-square statistical analysis of the data collected in this study led to failure to reject the null hypotheses H_1 , H_2 , and H_3 . The sample size in this study ($N = 131$) was sufficient to ensure that the minimum and expected cell counts were within operational parameters for chi square cross-tabulation analyses (i.e., no single expected frequency was less than 1 and in no table were 20% or more of expected values less than 5).

CHAPTER V

Summary, Conclusions, and Recommendations

The purpose of this study was to identify and compare the learning style characteristics of pre-admission and senior students of CAAHEP accredited entry-level athletic training education programs. If there was an even distribution of learning styles among pre-admission students, while a distinct pattern specific to one or two learning styles was found among senior students, then the possibility that certain learning styles are more suited to the profession of athletic training might exist. The ramifications of identifying distinct learning styles for ATS on instructional preparation and maximal educational benefit for students and faculty could be enormous. This research study tested three hypotheses to evaluate whether a learning style characteristic was different in senior athletic training students than in pre-admission athletic training students. The results of this study found no significant differences in the types of learning style characteristics between pre-admission and senior athletic training students. Also, no significant differences were found between male and female pre-admission and senior athletic training students. In addition, senior ATS were not more likely to have a pattern of learning styles primarily composed of converger and diverger learning styles.

This study confirms the findings of Harrelson et al. (1998) and Coker (2001), which found that there is no dominate learning style among athletic training students. Draper's (1989) study showed that 60% of 102 candidates taking the NATABOC

examination were classified as kinesthetic learners. Draper's (1989) study provides the only example found of a trend towards a dominant learning style in athletic training students within athletic training education research. The current study evaluated athletic training students from nine CAAHEP accredited programs with $N = 131$ participants, which was the largest sampling of programs and total number of participants found in the current research on learning styles among athletic training students. The contents of Chapter V are presented in three sections: a) discussion of hypotheses, b) conclusions, and c) recommendations for further research.

Discussion of Hypotheses

The following discussion focuses on the three hypotheses tested in this study, the results, and previous research findings. The discussion focuses on the findings of this study in the context of the previous research conducted on learning style characteristics in athletic training education. Each hypothesis serves as the basis for the discussion.

H_1 stated no significant difference between the pattern of learning style characteristics of pre-admission and senior students in CAAHEP accredited athletic training education programs (ATEPs) will exist. The Kolb-LSI (1985) IIa was utilized to assess the learning style characteristics of athletic training students in this study. There are four learning style characteristics identified by the Kolb-LSI IIa, the Accommodator, Assimilator, Converger, and Diverger. The chi square analysis led to failure to reject the H_1 null hypothesis thereby indicating no difference in learning styles of pre-admission and senior students. This hypothesis evaluated pre-admission and senior athletic training students to assess if the learning styles of students entering the programs were consistent with those graduating from the programs. This was an attempt to see if the selective

admission process was also serving as a filter or barrier to certain learning styles characteristics. Neither, Coker (2001), Harrelson et al. (1998), nor Draper (1989) looked at learning style characteristics of pre-admission students. The results in the current study found no significant difference between pre-admission and senior ATS. Coker (2001) found no statistical significance between learning style characteristics and did find all learning styles to be present among athletic training students evaluated. Findings of this study concur with Coker (2001) that all learning styles are present among any group of athletic training students, whether pre-admission status or admitted to the program.

Harrelson et al. (1998) found a lack of clear preference for kinesthetic and tactile learning experiences among their participants. This was consistent with the current study, which indicated only 26.8% of seniors were Accommodators, which most closely matches the kinesthetic learning style. Draper (1989) found that 60% of 102 respondents taking the NATABOC exam were classified as kinesthetic learners. Draper's (1989) findings are noteworthy; however, the current study found that only 30.5% of all ATS and 26.8% of seniors were of the accommodator learning style. The 60% finding of Draper (1989) may appear significant, but without further statistical analysis one cannot draw conclusions for direct comparison.

This study design assessed a total $N = 131$ athletic training students from 9 CAAHEP accredited programs in District 4 and District 9 of the NATA. Coker (2001) evaluated a total $N = 26$ athletic training students from one CAAHEP accredited entry-level ATEP. Harrelson et al. (1998) evaluated a total $N = 27$ athletic training students enrolled in one CAAHEP accredited entry-level ATEP. The small number of subjects in these studies may have an impact on the statistical analysis utilized; however, a large-

scale sampling of a population with a learning style inventory is difficult. Billings (1991) noted that computerized versions of learning style inventories allow for easier testing of much larger populations, via the World Wide Web. Future evaluation of athletic training education students' learning styles on a large scale might be through a web based learning style inventory, thus increasing the total N, which would increase the reliability and validity of future research.

H₂ stated senior students who are in CAAHEP entry-level ATEPs are more likely to have a pattern that is composed of primarily converger and diverger learning styles than the accommodator and assimilator pattern of the pre-admission students. The null version of this hypothesis was tested. Senior athletic training students were found not to possess any primary learning style, specifically converger or diverger. Harrelson et al. (1998) noted other research that identified the importance of direct and kinesthetic experiences to learning in allied health education programs. The results of this study do not support the findings of Draper (1989) or Harrelson et al. (1998); however, the learning styles in the previous research used different classifications of learning styles and a direct comparison cannot be made.

There were no significant findings in H₂. However, it does provide support for the fact that the H₁ null hypothesis was rejected. If a significant difference had been found between pre-admission and senior ATS combined learning styles, then one would expect a pattern could be identified; however, H₂ only investigated one possible pattern, though the selected pattern for evaluation was thought the most likely based on the findings of Draper (1989) and Harrelson et al. (1998).

H₃ stated no significant difference between the pattern of learning style characteristics of female and male pre-admission and senior athletic training students will exist. This study found no significant difference existed based on a chi square test of association. This was a large cross tabulation with 16 cells. Although the required minimum cell counts were met, the relatively small N = 128 leaves room for some unreliability in the results. Since current athletic training education research on learning styles by Coker (2001), Harrelson et al. (1998) and Draper (1989) did not evaluate differences between female and male athletic training students' learning styles, this was a new area for research. This previous lack of study may have been a result of these previous studies having a small number of participants. The current increase in female membership in the NATA and the resulting increasing number of NATABOC certified female athletic trainers warrants further investigation in regards to learning style and gender relationships in athletic training education programs.

The impact of gender on learning style is open to debate. Aaron and Skakun (1999) in a study of medical students found there was no significant correlation between gender and learning style. Holley and Jenkins (1993), in a study of 49 students enrolled in accounting courses, included gender as an explanatory variable for learning style in their model since previous work in accounting learning style research had substantiated gender's impact on test performance. Kraft (1976) compared learning styles of male and female education majors and the results indicated that men tended to be independent, avoidant, and competitive learners, while women preferred dependent and participatory styles. The Kraft (1976) study, however, may not be as relevant as women's roles in society and sports have changed significantly. The exact relationship between gender

and learning style is not quite known; however, it is recommended that an educator be sensitive to this relationship (Davis, 1993).

Implications of Learning Style Inventories in Athletic Training Education

The current literature abounds with evidence establishing the existence of learning styles and the impact of learning style prescription on a student's education (Curry, 1999; Fox, 1984; Lockhart & Schmeck, 1983). Learning style prescription, where an instructor uses the learning style profile of his or her class to develop an effective lesson plan for a day, week, or semester, was found consistently in literature regarding other allied health care professions' educational program enhancement (Fuller, 1997). Pigg, Busch, and Lacy (1980) stated that learning style inventories do appear to be useful and that an LSI may be effectively employed as a useful device in educational programs or in a participatory approach to the development of adult education programs.

This study found no significant relationships between pre-admission and senior athletic training students learning style characteristics by gender. This suggests that all four learning styles are found among athletic training education students both pre-admission and senior as well as male and female. The development of an athletic training education curriculum centered on one or two specific learning styles is not warranted based on the results of this study. Administering a learning style inventory as part of a selective admission process of an ATEP, however, may be warranted. This is based on the current literature that does agree that learning is enhanced and improved when learning styles are taken into consideration with lesson, curricular, and classroom implementation (Curry, 1999; Fox, 1984; Lockhart & Schmeck, 1983; Pigg, et al., 1980). The selective admission process of CAAHEP ATEPs allows for a unique vehicle to

create learning style profiles of each entering class that can be disseminated to ATEP faculty, both clinical and didactic, for curricular and course changes based on the learning style profile. The athletic training educator should still develop lessons that try to incorporate a variety of learning styles in each lesson. The foreknowledge of an athletic training class' learning style profile may become useful, in one-on-one teaching or for clarification of a difficult concept. The instructor can try to relate the concept using a construct more appropriate to that student's learning style.

This study, however, would not support the use of the learning style inventory as a screening or weighted criteria for the admission into a CAAHEP ATEP. This implementation may be more feasible in a CAAHEP ATEP due to the smaller class enrollments in ATEP major specific courses.

The small population size of previous research in athletic training education learning style research and this study's $N = 131$ does, however, leave room for further research with larger sample sizes. The logistics of the administration of a learning style inventory can impact the number of participants. The use of a World Wide Web based learning style instrument may be a future research consideration for assessing athletic training students' learning styles.

Conclusions

The following conclusions can be drawn about learning style characteristics of pre-admission and senior athletic training students based on the three hypotheses tested in this study:

1. No significant difference exists between the pattern of learning style characteristics of pre-admission and senior students in CAAHEP accredited athletic training education programs.
2. Senior athletic training students enrolled in CAAHEP ATEPs are not more likely than pre-admission students to be of the converger and diverger learning styles.
3. No significant differences exist between the pattern of learning styles of female and male pre-admission and senior athletic training students.

Recommendations for Future Research

Based on the results of this study, the following recommendations seem warranted:

1. Continued research is needed on learning style characteristics of athletic training students with larger sample sizes.
2. A meta-analysis consisting of this study and the current learning style research should be conducted on athletic training education.
3. The replication of this study, using a web based learning style inventory, should be conducted to increase sample size.
4. A comparison of the learning style characteristics of NATA Hall of Fame winners, Educator of the Year winners, and other award winners should be conducted to determine if certain learning style characteristics exist among athletic training high achievers.
5. Impact studies of course and curricular modules based on learning style profiling of entering athletic training classes are needed.

6. Future research is needed on the impact of learning styles on clinical education of athletic training students.

Although this study did not demonstrate any significant differences in learning styles among ATS, the study did provide consistent findings with previous research that was based on small sample sizes and limited to learning style evaluation of one CAAHEP ATEP. This study expanded the current body of research by contributing learning style analysis to nine CAAHEP entry-level athletic training education programs from Districts 4 and 9 of the NATA and by using a larger sample size ($N = 131$) than previous studies.

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APPENDIX A

Initial Contact Letter and Reply Card to Identify Program Participation

[Date]

Tusculum College
60 Shiloh Rd.
P.O. Box 5119
Greeneville, TN 37745

Dr. [Program Director Name]
Institution Name
Institution/ Directors Address
City, State Zip

Dear Program Director,

I am currently working on completing my dissertation at Middle Tennessee State University, where I am conducting research into the learning style characteristics of pre-admission and senior level Athletic Training Students in CAAHEP accredited athletic training education programs. I will be assessing the learning style characteristics in fifteen CAAHEP Accredited programs randomly selected from District 4 and 9 of the NATA

I am asking if you and your program would be willing to allow me to have access to 10 pre-admission status students and 10 senior athletic training students during the spring semester of 2003. If you are willing to assist in my dissertation and to further research in the field of athletic training education, please complete the enclosed response card accordingly. Please note: the learning style data collected on your students will be made available to you and your program.

Once all response cards have been returned, a random number table will be used to select fifteen ATEP programs from those that responded. If at this point your ATEP is selected, I will contact you via mail, phone or email to set up a date for me to come to your program late in the spring semester of 2003 to conduct my research.

I have enclosed a copy of the informed consent form that provides you with an overview of my dissertation research area. If you have any further questions or concerns please feel free to contact me via email: efuchs@tusculum.edu or at 1 (800) 729-0256 x735.

Thank you for your time and consideration of this matter. I appreciate and look forward to getting to work with you and your students this fall.

Sincerely,

Eric J. Fuchs, MA, ATC/L, EMT-IV
Coordinator of Clinical Education / Assistant Athletic Trainer
Tusculum College
60 Shiloh Rd.
P.O. Box 5119
WK: 1.800.729.0256 x735
HM: 1.423.638.9808
Fax: 1.423.636.7404
Email: efuchs@tusculum.edu

EJF
Tusculum College
PO Box 5119
Greeneville, TN 37745



TO: Dissertation Research
Eric J. Fuchs, MA, ATC/L, EMT-IV
Tusculum College
PO Box 5119
Greeneville, TN 37745

PLEASE CHOOSE ONE OF THE FOLLOWING AND MAIL BACK:

- OUR PROGRAM IS WILLING TO PARTICIPATE IF SELECTED TO BE ONE OF THE 15 PROGRAMS IN THE STUDY.**
- AT THIS TIME OUR PROGRAM WILL NOT BE ABLE TO OFFER ASSISTANCE TO YOUR RESEARCH PROJECT**

Dissertation Research

Researcher: Eric J. Fuchs, MA, ATC/L, EMT-IV
Dissertation Chair: Malissa Martin, Ed.D., ATC/L
Title of Research Project:
An evaluation of learning style characteristics of athletic training students in CAAHEP accredited Programs Pre-Admission and Senior Standing.

CODE: 012506

APPENDIX B

Notification of Selection as One of Fifteen Programs for Data Collection Letter

[Date]

Tusculum College
60 Shiloh Rd.
P.O. Box 5119
Greeneville, TN 37745

Dr. [Program Director Name]
Institution Name
Institution/ Directors Address
City, State Zip

Dear Program Director,

Congratulations and thank you, your program was selected randomly from other programs in Districts four and nine of the NATA who were willing to participate.

Please find enclosed a copy of the IRB Consent form. Please submit this to your Institutional Review Board for permission to conduct my research on your campus. If you are too busy please contact me via email or any numbers below with whom at your institution I need to contact and I will follow-through with the necessary paperwork.

Please contact me as soon as possible with a tentative date in April or May of 2003 for me to come out and administer the Kolb LSI to your athletic training students. If at all possible, I would prefer either a Friday or Monday, Saturday would be optimal but I realize this may interfere with student clinical, game coverage or their free time.

Please return the enclosed postage paid card marked as to whether you are still willing to participate. If I have not heard from you via email or phone prior to receiving this card from you I will contact you directly.

I appreciate you, your institution and your students' assistance with my dissertation research. I will provide you with the results of the Learning Styles of your pre-admission and senior athletic training students. If you have any further questions or concerns please feel free to contact me via email: efuchs@tusculum.edu or at 1 (800) 729-0256 x735.

Sincerely,

Eric J. Fuchs, MA, ATC/L, EMT-IV
Coordinator of Clinical Education / Assistant Athletic Trainer
Tusculum College
60 Shiloh Rd.
P.O. Box 5119
WK: 1.800.729.0256 x735
HM: 1.423.638.9808
Fax: 1.423.636.7404
Email: efuchs@tusculum.edu

APPENDIX C

Informed Consent Form

Institutional Review Board Middle Tennessee State University

Participant Consent Form

Researcher: Eric J. Fuchs

Participant# _____

Title of Research Project: Learning Style Characteristics of Athletic Training Students in CAAHEP Accredited Programs Pre-Admission and Senior Standing.

You are invited to participate in a research study that is designed to evaluate the learning style characteristics of students enrolled in CAAHEP accredited programs. The purpose of this study is to identify and compare the pattern of learning style characteristics of pre-admission and senior standing students in CAAHEP accredited athletic training education programs. The information will be used to help athletic training education program (ATEP) directors to design more effective courses, course syllabi, instructional methods, implement more effective multi-media and improve curriculum design. You will be asked to complete a biographical data sheet and the Kolb LSI-IIa learning style inventory; which should take less than forty-five minutes, but you will be given as much time as you need to complete the forms.

I, _____, as a participant in this study understand that:

- 1) I have volunteered to participate in this study, and I have not been coerced in any way into participating,
- 2) I may withdraw from this study at any point in time for any reason without any penalty or prejudice by Middle Tennessee State University or its staff and faculty, by the researcher, or any other institution or individual,

Participant Initials _____

Researcher Initials _____

- 3) I will be asked to complete a biographical data sheet and the Kolb LSI-IIa learning style inventory,
- 4) There are no risks or discomforts anticipated or foreseen for the participants,
- 5) The results from this study may be published, but any information from this study that can identify a participant will remain confidential,
- 6) Any questions or concerns with respect to this research study may be addressed to Eric J. Fuchs (Researcher) by calling (423) 638-9808 or email: ejf2a@mtsu.edu.
Complaints regarding the study may be presented to the Office of Sponsored Programs Dr. Myra Norma, Director, by calling (615) 898-5010 or email: mynorman@mtsu.edu,
- 7) My consent is given voluntarily and free of any coercion. As a participant I may refuse to participate or withdrawal from any part of this study at any time and,
- 8) I have received from Eric J. Fuchs a signed and dated copy of this consent form

HAVING READ THE INFORMATION PROVIDED ABOVE, I HAVE MADE THE DECISION TO PARTICIPATE. MY SIGNATURE INDICATES THAT I WILL PARTICIPATE.

PARTICIPANT NUMBER: _____

Participant's Signature

Date

Researcher's Signature

Date

APPENDIX D

Kolb LSI-IIIa Learning Style Inventory

LEARNING-STYLE INVENTORY

The Learning-Style Inventory describes the way you learn and how you deal with ideas and day-to-day situations in your life. Below are 12 sentences with a choice of endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning something. Try to recall some recent situations where you had to learn something new, perhaps in your job or at school. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn *best*, down to "1" for the sentence ending that seems *least* like the way you learn. Be sure to rank all the endings to each sentence unit. Please do not make ties.

Example of completed sentence set:

1. When I learn: 2 I am happy. 1 I am fast. 3 I am logical. 4 I am careful.

Remember: 4 = most like you 3 = second most like you 2 = third most like you 1 = least like you

	A	B	C	D
1. When I learn:	<input type="checkbox"/> I like to deal with my feelings	<input type="checkbox"/> I like to think about ideas.	<input type="checkbox"/> I like to be doing things.	<input type="checkbox"/> I like to watch and listen.
3. When I am learning:	<input type="checkbox"/> I tend to reason things out.	<input type="checkbox"/> I am responsible about things.	<input type="checkbox"/> I am quiet and reserved.	<input type="checkbox"/> I have strong feelings and reactions.
5. When I learn:	<input type="checkbox"/> I am open to new experiences.	<input type="checkbox"/> I look at all sides of issues.	<input type="checkbox"/> I like to analyze things, break them down into their parts.	<input type="checkbox"/> I like to try things out.
7. I learn best from:	<input type="checkbox"/> observation.	<input type="checkbox"/> personal relationships.	<input type="checkbox"/> rational theories.	<input type="checkbox"/> a chance to try out and practice.
9. I learn best when:	<input type="checkbox"/> I rely on my observations.	<input type="checkbox"/> I rely on my feelings.	<input type="checkbox"/> I can try things out for myself.	<input type="checkbox"/> I rely on my ideas.
11. When I learn:	<input type="checkbox"/> I get involved.	<input type="checkbox"/> I like to observe.	<input type="checkbox"/> I evaluate things.	<input type="checkbox"/> I like to be active.

APPENDIX E

Participant Demographic Data Collection Form

RESEARCHER: Eric J. Fuchs

Title of Research Project: AN EVALUATION OF THE LEARNING STYLE

CHARACTERISTICS OF ATHLETIC TRAINING STUDENTS IN CAAHEP ACCREDITED
PROGRAMS PRE-ADMISSION AND SENIOR STANDING.

PARTICIPANT # _____ SEX: ___ MALE ___ FEMALE AGE: _____

RACE: _____ 1-Caucasian, 2-Hispanic, 3-African American, 4-Native American, 5-Other/Mixed

1. HOW MANY CREDIT HOURS OF COLLEGE COURSE WORK HAVE YOU COMPLETED? _____
2. HOW MANY TOTAL SEMESTERS OF COLLEGE HAVE YOU COMPLETED? _____
3. WHAT IS YOUR CURRENT CUMULATIVE GPA? ___ 0-1.4 ___ 1.5-2.4 ___ 2.5-3.4 ___ 3.5+
4. ARE YOU CURRENTLY ENROLLED IN A FOUR-YEAR UNIVERSITY OR COLLEGE? YES NO
5. ARE YOU CURRENTLY IN THE PRE-ADMISSION PROCESS OF A CAAHEP ACCREDITED ATEP PROGRAM? ___ YES ___ NO IF YES Answer questions 7 & 8 IF No Answer 9
6. HOW MANY SEMESTERS DO YOU HAVE UNTIL YOU MAKE APPLICATION TO THE CAAHEP ACCREDITED ATHLETIC TRAINING EDUCATION PROGRAM AT YOUR INSTITUTION? _____
7. DO YOU ONLY PLAN TO MAKE APPLICATION TO THE CAAHEP PROGRAM AT THE CURRENT INSTITUTION YOU ARE ATTENDING? ___ YES ___ NO
8. ARE YOU CURRENTLY CONSIDERED A SENIOR IN A CAAHEP ACCREDITED ATEP PROGRAM? ___ YES ___ NO
9. WHAT STATE ARE YOU FROM? _____

APPENDIX F

Researcher Scripted Instruction for Participants

Hello, my name is Eric Fuchs and I would like to thank you for your willingness to be a participant in this research study. Please leave the packet unopened until I ask you to open it. The purpose of this study is to identify and compare the pattern of learning style characteristics of pre-admitted and senior students of a CAAHEP accredited entry-level athletic training education program. The packet in front of you contains two informed consent forms, a demographic data sheet, and a Kolb LSI-IIa learning style inventory. Everyone, please open the folder and verify that these forms (hold up a blank copy of each) are there. Please read the informed consent form and sign both copies.

Now take out the Demographical data form. Please complete the information and place it back in the folder, so I will know when you are all finished. Please do not start on the learning style inventory until instructed to do so. You have as much time as needed; however it should take you only 10 minutes to complete the demographical data form.

Has everyone completed the demographic data form? (Look around the room to assure every student has completed the form.) Now, take out the learning style inventory form. Please listen to the following directions carefully, and do not start until you are instructed to do so.

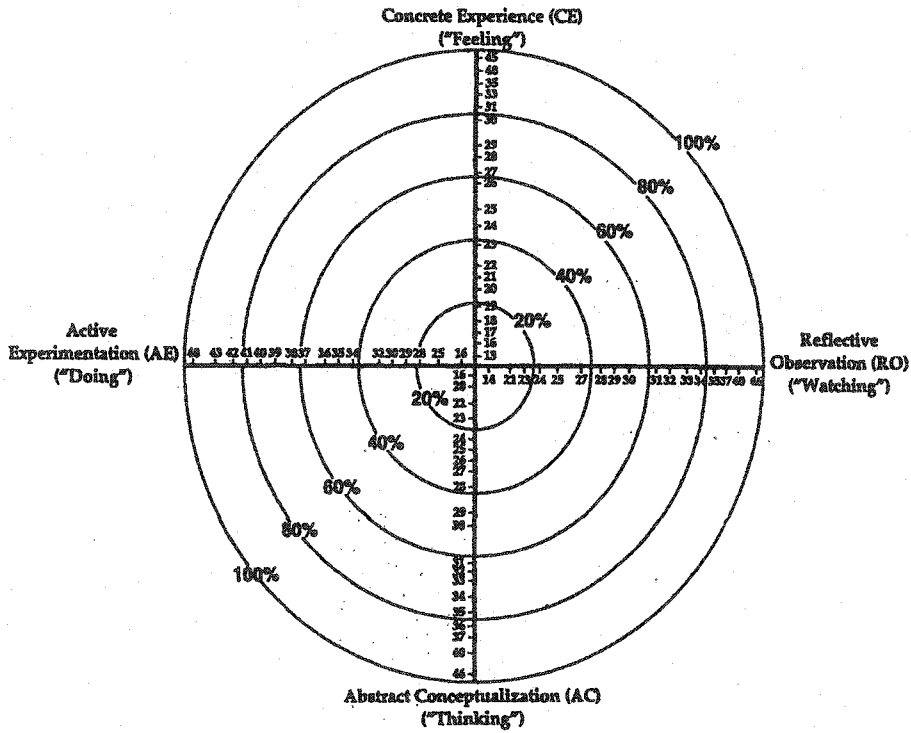
Please start by placing whether you are pre-admission or a senior student in your ATEP on the line that says "position" and the name of the university where it says "organization" and today's date where it says "date". On the backside of the Learning

Style Inventory you will be asked to complete 12 sentence sets. Each has four endings. Rank the endings for each sentence according to how well you think each one fits with how you would go about learning. Try to accurately recall some recent situations where you had to learn something new. Then, using the spaces provided, rank a "4" for the sentence ending that describes how you learn best, a "3" for second best, a "2" for occasionally and down to a "1" for the sentence ending that seems least like the way you learn. Be sure to rank all the endings for each sentence. Please do not make ties. Please note the "Example" on the backside of the Learning Style Inventory prior to starting. You have as much time as needed to complete the inventory. When you are finished, please bring the completed forms to the researcher in the front of the room, and you may leave. Thank you for participating. Does anyone have questions? You may complete the learning style inventory.

APPENDIX G

Kolb LSI-IIa Learning Style Inventory Score Sheet

THE CYCLE OF LEARNING



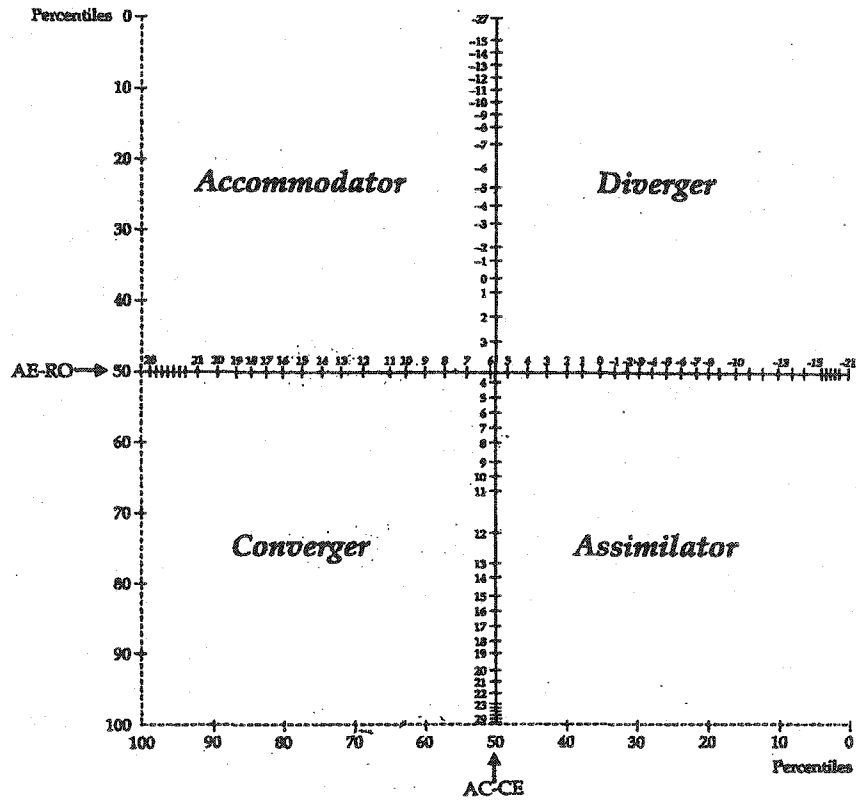
— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	= <input type="text"/>
1A	2C	3D	4A	5A	6C	7B	8D	9B	10B	11A	12B	CE Total

— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	= <input type="text"/>
1D	2A	3C	4C	5B	6A	7A	8C	9A	10A	11B	12C	RO Total

— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	= <input type="text"/>
1B	2B	3A	4D	5C	6D	7C	8B	9D	10D	11C	12A	AC Total

— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	— +	= <input type="text"/>
1C	2D	3B	4B	5D	6B	7D	8A	9C	10C	11D	12D	AE Total

LEARNING-STYLE TYPE GRID



APPENDIX H

MIDDLE TENNESSEE STATE UNIVERSITY INSTITUTIONAL

REVIEW BOARD APPROVAL LETTER

Department of Mathematical Sciences
MTSU P.O. Box 34
Murfreesboro, Tennessee 37132
Office: (615) 898-2669 • Fax: (615) 898-5422

MIDDLE
TENNESSEE

STATE UNIVERSITY

Jan Zijlstra, Ph.D.
Kirksey Old Main Building 257
(615) 898 2691 (O)
(615) 898 5422 (F)
zijlstra@mtsu.edu

TO: Eric J. Fuchs

FROM: Jan Zijlstra *JZ*

DATE: February 4, 2003

RE: An evaluation of the Learning Style of Student Athletic Trainers in CAAHEP accredited Training Education Programs. (Protocol No. 03-154).

The Middle Tennessee State University Institutional Review Board (IRB), or a representative of the IRB, has reviewed your research proposal identified above. It has determined that the study poses minimal risk to subjects and qualifies for an expedited review under 45 CFR 46.110 and 21 CFR 56.110.

Approval is granted for data collection from up to 300 adults during the indicated approval period. Final approval is for one (1) year from the date of this memorandum. Please note that any change to the protocol must be submitted to the IRB through the Office of Sponsored Programs.

Final Approval Date: February 4, 2003



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