

DISSERTATION

PEER ASSISTED LEARNING IN ATHLETIC TRAINING EDUCATION:  
PREVALENCE, UTILIZATION, EFFECTIVENESS, AND POTENTIAL BENEFITS

Submitted by

Christine M. Odell

School of Education

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Doctoral Committee:

Department Chair: Jean Lehmann

Advisor: William Timpson

Co-Advisor: Cathy Kennedy

Gene Gloeckner

Dennis Cole

## ABSTRACT OF DISSERTATION

### PEER ASSISTED LEARNING IN ATHLETIC TRAINING EDUCATION: PREVALENCE, UTILIZATION, EFFECTIVENESS, AND POTENTIAL BENEFITS

Because athletic training education has been just recently standardized and accredited in comparison to other allied health care education programs, this mixed method study was designed to answer multiple research questions regarding the use of formalized peer assisted learning (PAL) in athletic training education. The research questions concentrated on: (a) the prevalence of formalized PAL in athletic training education, (b) how athletic training education program (ATEP) directors view formalized PAL in regard to familiarity, comfort using formalized PAL and effectiveness of PAL, (c) Which ATEP directors utilize PAL in relation to amount of time as an ATEP director, amount of pedagogical training and amount of time teaching at the college/university level, (d) what are the reasons that formalized PAL is used and is not used, (e) in what athletic training educational settings is formalized PAL utilized and finally, (f) will athletic training students (ATSS) who participate in a formalized PAL program have greater success in passing the Board of Certification national exam for certifying athletic trainers.

To answer the questions the researcher designed an original survey instrument, pilot tested the instrument then invited all (343) directors from accredited ATEPs to participate in the on line survey via SurveyMonkey ®. Forty-six ATEP directors chose to participate in the on line survey. The researcher used SPSS Graduate Pack™ 16.0 for Mac ® to analyze the data and calculate the

appropriate descriptive statistics and independent samples t-tests. Following the analysis of the quantitative survey data, the researcher conducted follow-up interviews with four ATEP directors in order to gather qualitative data to further explain why formalized PAL is or is not utilized in athletic training education.

The findings from this study in regard to the independent samples t-tests were statistically insignificant. When attempting to see if there was a relationship between an ATs participation in a formalized PAL program and their subsequent success in passing the BOC exam for entry-level athletic trainers, the researcher found that 11 of the 46 survey participants chose not to divulge their students' first time passing rate. Moreover, the same 11 survey participants also reported not utilizing formalized PAL. Hence, even though the findings were calculated as statistically insignificant, the researcher does feel these findings were somewhat inconclusive. Additionally the researcher did not find a significant relationship between the amount of time an ATEP director had taught at the college/university level and their use of formalized PAL.

Over the span of the 2005-06 through the 2008-09 academic years, the use of formalized PAL in ATEPs did increase slightly, however informal PAL was still the most frequent response in regard to the use of any type of PAL utilized. Overall, 45.7% of the survey participants reported feeling that PAL was an effective teaching strategy and 10.9% of the survey participants felt PAL was a very effective teaching strategy.

After conducting the follow-up interviews, the researcher found that of the four interviewees, three were familiar with the concept of PAL, though none of them

had a formalized program within their respective curriculums. One interviewee was interested in learning more about using PAL as a teaching technique.

The collective findings of this study provide a foundation for additional research to determine what teaching techniques ATEP directors are utilizing and what teaching strategies are proving to be most beneficial to ATs in regard to passing the rigorous BOC exam on the first attempt. Furthermore, the researcher of this study feels that this study also helped emphasize the need for all athletic trainers to be adequately trained *to teach* regardless of their practice setting.

Christine Odell  
School of Education  
Colorado State University  
Fort Collins, CO 80523  
Fall, 2010

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## **CHAPTER 1: INTRODUCTION**

### **Background**

Certified athletic trainers (ATCs) are allied health care professionals who specialize in emergency care, diagnosis, evaluation, and rehabilitation of athletic injuries and illnesses. The athletic training profession has existed, in essence, as long as athletes have been competing. When athletes need assistance with injuries and/or information regarding many health care topics, they consult ATCs. The rise and recognition of the athletic training profession were rather long drawn-out processes, however. The National Athletic Trainers' Association (NATA) was formally organized and recognized in 1950 and since that time the profession has evolved in order to serve the public as an integral part of the allied health care professions.

### **History of Athletic Training Education**

Athletic training education has its humble roots in mentoring and apprenticeships. Athletic training education did not become formalized until 1959 when the NATA officially approved a curriculum model (Delforge & Behnke, 1999). The 1959 model of athletic training education was composed of courses in the basic sciences such as anatomy, physiology, chemistry, physics, kinesiology, and physiology of exercise and various other courses directly related to the job requirements of ATCs. According to Delforge and Behnke et al. (1999) athletic



training students (ATs) were also required to take courses that satisfied requirements for a teaching certificate in either health or physical education. Obtaining a teaching credential in addition to completing the required athletic training courses was put in place to assure future athletic trainers would be highly marketable for the secondary school setting. At this juncture in athletic training education the NATA leaders also recommended that ATs also consider taking prerequisite courses for physical therapy school in order to further enhance their employability. Unfortunately, with all of the historical information available on the course work required in early athletic training education, there is no information on how the didactic or clinical education was delivered.

In 1969 the NATA organized a professional education committee and approved the first athletic training specific curriculum programs at Mankato State University, Indiana State University, Lamar University and the University of New Mexico (Delforge & Behnke et al., 1999). One year later in 1970, the NATA Certification Committee administered the first national certification exam. Today, athletic training education is standardized, accredited and respected within academia and health care. Even though the NATA professional education committee had approved a curriculum model, little mention is made concerning the pedagogy involved in educating ATs.

Because of the strides made in standardizing athletic training education, ATCs are recognized as health care professionals with specialized training in the prevention, assessment, treatment and rehabilitation of musculoskeletal injuries. Current athletic training education programs (ATEPs) are designed around six

domains of knowledge: (a) Prevention, (b) clinical evaluation and diagnosis, (c) immediate care, (d) treatment, rehabilitation and reconditioning, (e) organization and administration, and (f) professional responsibility. The six knowledge domains are then broken down into twelve specific content areas of:

1. Risk management and injury prevention
2. Pathology of injuries and illnesses
3. Orthopedic clinical examination and diagnosis
4. Medical conditions and disabilities
5. Acute care of injuries and illnesses
6. Therapeutic modalities
7. Conditioning, rehabilitative exercise and referral
8. Pharmacology
9. Psychosocial intervention and referral
10. Nutritional aspects of injuries and illnesses
11. Health care administration
12. Professional development and responsibility.

The six knowledge domains represent the content of the national certification exam and the twelve content areas represent educational competencies (National Athletic Trainers' Association, 2006; National Athletic Trainers' Association, 2004). Since athletic training education is now standardized and accredited, athletic training education research must be done in order to ensure that athletic training students are properly prepared to join the work force.

In comparison to the amount of research done in other allied health care education programs concerning teaching methodologies, athletic training education research is limited. Additionally the leaders in the athletic training profession have rightfully moved the profession to an evidence-based allied health care discipline and thus athletic training educators must base curriculum and instructional decisions on evidence.

As ATEPs have evolved, athletic training educators have been researching various issues concerning athletic training education. In 2002(a) Turocy reviewed published research specifically on athletic training education. Turocy highlighted publications concerning: ATs learning styles, the importance of implementing critical thinking into athletic training lessons, factors that predict ATS success in passing the national certification exam for athletic training amongst others. Of the literature that Turocy reviewed however, nothing was mentioned about actual teaching methods that may enhance ATs' learning.

**Peer Assisted Learning and Allied Health Care Education.** Like other pre-professionals, ATs must pass a national certification exam to prove their professional competence before they earn the right to practice as an ATC. Based upon the educational research being conducted in other branches of allied health care in regard to benefits of Peer Assisted Learning (PAL) programs, the researcher feels ATs who participate in formalized PAL programs will also benefit from this teaching strategy. Furthermore, the researcher believes that those students who function as peer teachers will indeed be more prepared to pass the national certification exam for athletic trainers on the first attempt.

PAL is a pedagogic technique that has gotten some attention in the athletic training education research, but not regarding its effectiveness or actual prevalence within ATEPs. PAL occurs in and out of academia, in formal and informal contexts. In other words individuals can learn from their peers whether they are expected to or not. The effects of PAL have been studied to a rather large extent in medical education and to a lesser extent in other allied health care educational programs. Dandavino, Snell and Wiseman (2007) published a thorough review of eight medical-education articles related to PAL. The premise of their research was that teaching on multiple levels is an integral component of being a physician. After reviewing the literature, Dandavino et al. discovered three main reoccurring themes: "1. Medical students are future residents and faculty members who will have teaching roles 2. Medical students may become more effective communicators, as teaching is an essential aspect of physician-patient interaction and 3. Medical students with a better understanding of teaching and learning principles may become better learners." (p. 560-561). The conclusions drawn by Dandavino et al. concerning medical students and their future teaching responsibilities parallel what will be expected of students when they become ATCs. Many ATCs become clinical instructors for ATSS, ATCs must communicate with and educate patients, parents and physicians and lastly if ATSS learn how to teach, they too may become better learners.

### **Statement of the Research Problem**

The problem was the lack of research available on effective teaching strategies in athletic training education. Concerns associated with a deficit in

athletic training pedagogy revolve around ATSs being under-prepared to pass the national certification exam and become competent allied health care professionals. The Board of Certification for Athletic Training (BOC) national certification examination has had a first time passing rate below 50% for the past six years (CASTLE Worldwide, Inc., 2003, 2004, 2005, 2006, 2007, 2008). Finding effective pedagogic techniques for ATSs may translate into ATSs having increased success when taking the aforementioned national certification exam for the first time.

The primary purpose of this mixed methods study, therefore, is to determine: if participation in a formalized PAL program increases an ATS's success rate in passing the BOC national examination on the first attempt and the actual number of undergraduate ATEPs utilizing formalized PAL programs. Secondary purposes of this research study will be: to determine if there is a relationship between an ATEP director's educational background and use or disuse of a formalized PAL program, in what athletic training educational settings formalized PAL is used, and to discover how familiar and how comfortable ATEP directors are with using formalized PAL in athletic training education.

### **Research Questions**

The researcher has sought to fill a significant gap in the athletic training education literature in regard to effective pedagogy. Because of the shortfall of in-depth research concerning PAL in athletic training education, the researcher of this study has posed the following questions:

- 1a. What is the prevalence of formalized PAL in entry-level ATEPs?
- 1b. When formalized PAL is utilized, what type of PAL is most frequently used?

2. How familiar are ATEP directors with formalized PAL?
- 3a. How comfortable are ATEP directors using formalized PAL?
- 3b. Are those ATEP directors who reported being somewhat comfortable, comfortable or very comfortable more likely to actually utilize formalized PAL compared to those survey participants who reported being either very uncomfortable or minimally comfortable?
4. What are the opinions of ATEP directors regarding the effectiveness of PAL?
5. What are the motivating reasons that ATEP directors utilize formalized PAL?
6. What are the reasons that ATEP directors do not utilize formalized PAL?
7. Is there a difference between an ATEP directors' amount of training in pedagogy/teaching methodologies and the use of formalized PAL in ATEPs?
8. Is there a difference in the use of formalized PAL and how long an ATEP director has been an educator at the college/university level?
9. When formalized PAL is used, how often is it used in certain athletic training educational settings?
10. Does participation in a formalized PAL program increase an ATS's success rate in passing the BOC national certification exam on the first attempt?
11. How will qualitative data (interview) converge with the quantitative data (derived from research questions 1-10) to help explain the role of PAL, either formal or informal, in athletic training education programs?

### **Definition of Terms**

**Entry-Level Athletic Training Education Program (ATEP):** An undergraduate or Master's level education program accredited by The Commission on Accreditation of

Athletic Training Education (CAATE) that prepares athletic training students to take the Board of Certification for Athletic Training national examination

**Athletic Training Student (ATS):** A student who is officially enrolled and active in the clinical portion of an Entry-Level Athletic Training Education Program

**Peer Assisted Learning (PAL):** “...PAL is the act or process of gaining knowledge, understanding, or skill in athletic training-related tasks among students who are at either different or equivalent academic or experiential levels through instruction or experience.” (Henning, Weidner, Jones, 2006)

**Formalized Peer Assisted Learning Program:** A PAL program where ATs are held academically accountable for teaching their peers.

The next three definitions are presented by Ten Cate and Durning (2007b)

**Near Peer:** teacher is one or more year(s) senior to the learner

**Peer:** teacher is the same academic year as the learner

**Inverse Peer:** teacher is one year junior to those they teach

**Peer Learner:** a student who is taught by a near peer, peer, or inverse peer

### **Study Delimitations**

This research study included all ATEP directors associated with an entry-level athletic training education program.

### **Significance of Study**

The significance of this research study stems from the paucity of published research regarding effective teaching strategies in athletic training education. Clark and Harrelson (2002) published an article outlining general educational principles that athletic training educators can use to enhance cognitive learning processes in

ATs. Although Clark and Harrelson provide an extensive insight into what cognitive processes should happen in athletic training education, they do not research specific pedagogic techniques that can be used to achieve those processes. Mensch and Ennis (2002) determined that using case studies, providing bona fide, practical experiences and creating a positive learning environment heightened ATs learning. Again, however, the authors provide little information for athletic training instructors on how to present material.

Specifically regarding PAL there is research establishing ATs perception of the prevalence of PAL in general (Henning et al., 2006), but the actual prevalence of formalized PAL programs in ATEPs has not been established. Furthermore, there has been no research done to determine if participating in a formalized PAL program benefits ATs in terms of preparation to pass the national certification exam. This research study provides information on athletic training PAL programs that has not been published previously.

Additionally, Walker (2003) published an article discussing general methods athletic training educators may consider using in order to promote critical thinking skills in ATs. Walker does not mention PAL specifically, but many of the concepts she discusses are intertwined in PAL processes. Hence, this study was also significant in establishing a base to study how PAL may enhance ATs ability to become critical thinkers.

The mixed methods approach was chosen as potentially the most beneficial for addressing the needs of athletic training educators. Quantitative data are necessary to establish evidence based curriculum practices and, additionally



according to Pitney and Parker (2001), qualitative information in athletic training research “complements traditional ways of thinking about research itself and promotes a greater understanding related to a certain phenomena.” (p. 185).

### **Researcher’s Perspective**

The researcher’s perspective for this study is derived from the belief that when an individual has a responsibility to teach something, that individual will take measures to learn material on a deeper level, i.e. to teach is to learn twice. Whether due to a sense of responsibility or to a sense of not wanting to “look bad”, the responsibility to teach can create a comprehensive understanding of material. The researcher agrees with Ten Cate and Durning (2007a) when they state, “Preparing for teaching calls for a different approach to the study material than studying to take a written examination.” (p. 550). The researcher’s bias going into this research project was that ATs who were held accountable for teaching their peers would pass the national certification exam for athletic trainers on their first attempt more frequently than those ATs who did not have an obligation to teach. Moreover as the research questions evolved, the researcher believed that ATEP directors who had at least some background in pedagogy and/or had been in a teaching position longer would have a greater tendency to utilize formalized PAL.

## **CHAPTER 2: REVIEW OF THE LITERATURE**

### **Introduction**

The literature review will first briefly cover general topics researched concerning athletic training education. Chapter two will then narrow the focus to: an overview of the use of PAL in other professions, students' perceptions of formal and informal PAL, the comparison of student (peer) teachers to trained faculty teachers, the impact of participating in PAL programs on the peer learner, and the impact of participating in PAL programs on the peer teacher. In order to find the most recent literature, the researcher used the following search engines: EBSCO Host, ERIC, Medline, Pub med, Digital Dissertations, amongst others, using the following key words: peer assisted learning, PAL, peer teaching, peer learning, clinical education, athletic training, collaborative education and allied health care.

### **Athletic Training Education Research**

Several areas of athletic training education have been investigated, but there is a significant gap in the research concerning specific pedagogic techniques that may be effective in transferring athletic training knowledge to ATs. Areas within athletic training education that have been researched are: assessments of ATs learning styles (Gould & Caswell, 2006; Stradley, Buckley, Kaminski, Horodyski, Fleming, & Janelle, 2002), the need to develop ATs ability to think critically (Heinrichs, 2002; Laurent & Weidner, 2001; Leaver-Dunn, Harrleson, Martin, &

Wyatt, 2002; Walker et al., 2003), learning theories for athletic training education (Peer & McClendon, 2002), the need to incorporate active learning activities into athletic training classrooms and clinical settings (Walker et al., 2003) and ATs perception of the prevalence of PAL (Henning et al., 2006; Morris, 2008).

Of the aforementioned published articles on athletic training education, Walker's et al. (2003) research on the need for athletic training instructors to utilize teaching strategies that make students more actively involved in the educational process is particularly significant to this literature review. Walker analyzed data from multiple Internet search engines regarding disposition to think critically and "various critical-thinking pedagogic techniques." (p. 263). Walker discusses multiple definitions of critical thinking and the overwhelming need that ATs develop critical thinking skills. Although Walker does not specifically discuss using PAL, she argues that ATs who are active in the learning process will be better prepared to become critical thinkers. Because students are responsible for teaching in a formalized PAL program this teaching strategy can obviously be considered an active teaching method.

### **Peer Assisted Learning Research**

Educators in many allied health care fields (i.e., medicine, nursing, athletic training) have studied and implemented various forms of PAL into their academic programs based on the results from education research. Since athletic training education is in its infancy compared to many other allied health care educational programs, limited information is available in regard to effective pedagogic methods used in athletic training education programs. For the sake of this literature review,

the researcher has not elaborated on the precise method of PAL programs discussed in each study e.g., near peer vs peer teaching etc. The researcher also chose to use peer teacher and student teacher interchangeably. Furthermore and for the sake of clarity, the researcher will refer all individuals being taught by another student as the learner or student learner.

### **Use of PAL in Professions Outside Allied Health Care**

The use of PAL in the education field in general is well documented. PAL has been studied in areas of: physical education (Wallhead & O'Sullivan, 2007), English as a second language (Silvana & Cummings, 2007), social work education (Skehill, 2003; Topping, McCowan, & McCrae, 1998) amongst many others. Maheady, Mallette, and Harper (2006) reviewed peer-tutoring models including the Juniper Gardens Children's Project. This project was developed in the early 1980's and has been classified as 'ClassWide Peer Tutoring' or CWPT. CWPT was implemented to improve elementary school children's' reading, math and spelling abilities. Maheady et al. reviewed further reviewed the literature and found 25 published articles that showed CWPT to be an extremely effective teaching tool to improve students' academic performance.

### **Student Perceptions of PAL**

Although most students may not be aware of why curriculum and instruction methods are implemented, it is important for faculty members to be aware of how students feel about the learning process. More importantly, faculty members do have an obligation to ensure they are reaching all students to establish thorough understanding of material.

Outside allied health care, Parr, Wilson, Godinho, and Longaretti (2004) studied student perceptions of peer teaching amongst pre-service teachers. The researchers interviewed 120 students regarding the students' perceptions of an intentional PAL program. The authors identified predominant beneficial themes regarding the students' perceptions of PAL including, but not limited to: collaborating with peers, clarifying subject content, viewing situations from different perspectives, actively involving students in the learning process. In regard to peer assessment, however, interviewees did express that it was difficult to objectively assess their peers.

Henning et al. (2006) surveyed a convenience sample of 170 athletic training students (ATs) with respect to the students' opinions of how often PAL occurred in their respective educational programs. The researchers found that 66% of athletic training students sampled "...practiced a moderate to large amount of their clinical skills with other students." (p. 104). The authors concluded that ATs engage in PAL whether the program is intentional or not and the students feel that interacting with their peers help them refine their skills.

Bulte, Betts, Garner, and Durning (2007) solicited information from medical students who had participated either as a student teacher or learner in a PAL program. One of the researchers' goals was to identify the students' opinions regarding appropriate roles for student teachers. Three predominant roles were identified as appropriate for peer teachers: (a) information provider; (b) facilitator; and (c) role model. When peer learners were asked if they felt peer teachers performed well, the majority of learners did feel that peer teachers were effective in

a teaching role. Using free text, open-ended questions, the authors also asked the students what they felt were weaknesses about PAL programs. Again, three main topics emerged from the results: (a) peer teachers had less overall knowledge, (b) peer teachers had limited clinical experiences, and (c) peer teachers "...at times seemed more nervous..." (p. 587).

In a small-scale study, Costello (1989) analyzed questionnaires from 18 nursing students. The author asked the students if and how often peer teaching occurred in clinical education areas. Nursing students indicated that informal peer teaching did occur and 50% of the respondents admitted to learning a majority of their practical skills from other students. Moreover, those students who found themselves in a teaching position reported that they enjoyed the teaching experience.

Morris et al. (2008) analyzed data from 378 athletic training students about their perceived use of various aspects of PAL. The researcher found that athletic training students reported engaging in PAL activities more frequently in the classroom than in the non-classroom setting and athletic training students did feel that PAL was beneficial to their education.

Finally Ten Cate and Durning et al. (2007a) explain that near peer teachers are important to peer learners in the area of learning about the 'hidden curriculum' of an educational program. The hidden curriculum encompasses aspects of an educational program that are unwritten and include, but are not limited to: how students should act in certain classes, personalities of professors, and unwritten expectations of behaviors and outcomes.

## **Comparing the Capabilities of Peer Teachers to Experienced Faculty in Allied Health Care**

Tolsgaard, Gustafsson, Rasmussen, Hoiby, Muller, and Ringsted (2007) conducted an experimental, randomized, controlled study at the Centre for Clinical Education at Copenhagen University (medical school) that compared the effectiveness of student teachers to the effectiveness of full time faculty members in teaching certain clinical skills. The authors split a group of students (learners) into two separate groups: one group was taught specific clinical skills by student teachers and the other group (control) was taught the same clinical skills by a full time professor. The authors then compared the learners' exam scores on the same clinical skills. The results of this study revealed that students taught by student teachers performed equally as well on the exams as those students taught by full time faculty members.

Weidner and Popp (2007) found similar results to Tolsgaard et al. (2007) in a pre-test/post-test designed study conducted in athletic training education. Peer tutors and approved clinical instructors taught a review session on orthopedic assessment of the wrist/hand to two different groups of students (learners). All learners were enrolled in the same academic course at the time of the study and the student learners were randomly assigned to one of the two groups. Pre-test scores demonstrated no differences between the two learner groups. The results of the skills post-test clearly demonstrated that peer tutors were as effective as approved clinical instructors in reviewing the specific orthopedic exam skills. The authors also state that an intentional PAL program is a legitimate teaching tool to strengthen athletic training students' psychomotor skills.

Sengupta (2007) performed a study at the University of Edinburgh that once again separated student learners (medical students) into two groups. Each group was taught cardiac examination skills by either a cardiologist or by senior medical students, who had previously completed appropriate training led by a cardiologist. Using Likert scaled questions, student learners reported no significant differences between the student-led and physician-led groups in regard to: usefulness of session, tutor approachability, understandable explanations, and learner confidence about cardiovascular exam skills. Sengupta and colleagues concluded that using well-trained senior medical students might be "...a useful adjunct to traditional teaching methods." (p. 219).

Kassab, Abu-Hijeh, Al-Shboul, and Hamdy (2005) studied various factors related to student-led tutorials in the problem-based learning curriculum at a Bahrain medical school. One of the primary questions the researchers asked was, "Can students acting as tutors in PBL (problem-based learning) tutorials acquire similar tutoring skills as faculty tutors?" At the conclusion of this study the researchers found no statistically significant differences in student achievement examination scores between groups taught by student tutors and faculty tutors.

Using a quantitative research approach, Burke, Fayaz, Graham, Matthew and Field (2007) designed a study to investigate if students who were trained by near peers would perform adequately on a required standardized medical school clinical examination. The researchers recruited medical student volunteers to serve as peer teachers (n= 4) and peer learners (n = 28) for a five-week elective module in musculoskeletal examination. The peer learner group was split into two different



groups and received the peer training approximately four months apart. The peer teachers underwent additional training in the required subject then commenced with the training of their junior peers. Before officially beginning the training sessions, peer learners were assessed in regard to confidence in the ability to take a history and examine the musculoskeletal system. At the end of the academic year the peer learners and all their classmates were required to take a standardized examination that covers multiple subjects including musculoskeletal examination. The students who participated in the PAL program performed significantly better on the standardized exam for the musculoskeletal system compared to those students who did not participate in the PAL program.

Similar to studies comparing peer teacher performance to faculty teaching performance, Chenot (2007) studied student tutors' (senior medical students) ability to assess their junior classmates. Student tutors were compared to teaching doctors in regard to their ability to adequately and objectively assess junior medical students on standardized clinical examinations. The authors' statistical analysis revealed that even though the student tutors did have a tendency to award better grades to their junior peers, the scores given by the student tutors were, for the most part, not statistically different.

### **Impact of PAL Programs on the Learner**

Regardless of the overall intent of the study, most researchers have reported on recurring themes of how PAL programs affect the student learners. The first of these themes revolves around the social congruency theory (Ten Cate & Durning et al., 2007a), referring to the educational distance that exists between peer teachers

and peer learners. Students often felt that professors could not relate to students' experience level, but peer teachers understood students' confusion because the peer teachers had recently completed the same course work (Bulte et al., 2007; Kassab et al., 2005; Tolsgaard et al., 2007; Weidner & Popp et al., 2007).

Peer learners also consistently reported feeling less anxious when learning from peers compared to learning from professors or clinical instructors. In a survey study conducted by Henning et al. (2006), 60% of 138 athletic training students reported feeling less tense when performing clinical skills in front of peers compared to performing skills for a clinical instructor. Weidner and Popp et al. (2007) also reported a high percentage (70.4%) of their study sample that experienced decreased anxiety learning psychomotor skills from a peer. Additionally Weidner and Popp report that 44.4% of the athletic training students in their study said they felt increased self-confidence while learning and performing skills for peers. Kassab et al. (2005) also found that students felt more relaxed during student-led tutorial sessions during problem-based learning at the College of Medicine and Medical Sciences, Bahrain.

Burke et al. (2007) noted that 82% of the peer learners in their study reported that the PAL program had "... stimulated their enthusiasm for further learning..." (p. 579-580) and 62% of the learners indicated that the PAL program had improved their ability to work in group situations.

### **Impact of PAL Programs on Student Teachers**

Much of the literature on peer assisted learning emphasizes the impact that the act of teaching has on the peer teacher. Gartner, Kohler, and Riessman (as cited

in Whitman & Fife, 1998) describe the cognitive processes that are involved in teaching preparation. The processes are: review and organize the material then teach the required material. Whitman and Fife state that their research findings suggest that an individual may benefit more from explaining the material to someone else (compared to the individual hearing the information) due to the reorganization and integration that is required to teach material (p. 22).

According to Ten Cate and Durning et al. (2007a) having the obligation to teach others introduces a new motivation to study as well as possibly a new method to study material. Citing similar reasons as reported by Whitman and Fife et al. (1998), Ten Cate and Durning state that students who teach, "...not only 'learn twice'; the literature suggests that they learn in a different way, which possibly adds to a longer and more solid retention of knowledge." (p. 595). Ten Cate and Durning also note that teaching one's peers may enhance intrinsic motivation to know the material. The authors suggest that the intrinsic motivation stems from student teachers wanting to be perceived as competent by their peers. Ten Cate and Durning also include improved leadership skills of student teachers as a fundamental reason to implement PAL programs in medical education.

Sobral (2002) conducted a review of 447 medical student records of graduating students from 1993-2000 at the University of Brasilia. The researcher determined how many students had served as a student tutor at some time during their time in medical school and then compared the frequency of serving as a peer tutor to overall academic achievement, among other things. The researcher's results showed: 96.6% of the students had served as a peer tutor at least once

during their tenure at the school. The author's statistical analysis showed that a higher frequency of peer tutoring was associated with increasing student grade point averages (GPA's) over the course of peer tutoring. Sobral suggests that the increase in GPA may be attributed to the increased effort that student tutors had to put forth "...associated with the elaboration of learning required to help tutored peers understand and apply the knowledge and skills encompassed by the courses." (p. 1069).

In a qualitative study of physiotherapy students at McMaster University, Canada, Solomon, and Crowe (2001) analyzed reflective journals written by student tutors during their experience as tutors in a problem-based curriculum program. The authors' results reflect the findings of Ten Cate and Durning et al. (2007a) and Whitman and Fife et al. (1998) that students appreciate many different aspects of the learning that takes place via the teaching process. Student tutors had enlightening quotes such as, "...After a couple of attempts I was able to put forth some good questions that stimulated their (peer learners) thought processes..." (p. 182) and "In preparation for the tutorial I felt this obligation to somehow know more than the group to be able to assist them if needed..." (p. 183). The authors highlighted many student quotes that overwhelmingly place PAL in a positive light.

Tang, Hernandez, and Adams (2004) sought to determine if serving as a peer teacher in the area of diversity training in medical school would improve the peer teachers' sociocultural perspectives and attitudes regarding diversity issues in medicine. In this study, fourth year medical students served as facilitators for second year medical students in diversity-based discussions. The results of this

study also support the implementation of a PAL program. The peer facilitators in this study were found to have an improved understanding of the relationship that exists between sociocultural background, health and medicine.

Ten Cate (2007) describes a program at the University Medical Center, Utrecht, The Netherlands where medical students in their final year took an elective six-week rotation in teaching their junior peers. The peer teachers were required to teach their peers and pass a written exam on learning and teaching, write exam questions, write an essay on medical education and complete an 'advisory project'. Utrecht Medical Center designed its curriculum to have their graduates master seven competencies: medical expert, communicator, collaborator, manager, health advocate, scholar and professional. Having a teaching rotation for the students allowed the medical students to solidify their knowledge base thus allowing them greater opportunity to become medical experts. Furthermore, because the school included 'becoming a scholar' into the competencies, the professors thought it was necessary to devote time in the curriculum for medical students to learn to teach. Students choosing the elective teaching rotation have made comments with respect to having "...to really re-study..." material in order to be fully prepared for their teaching sessions and many of the student teachers' mandatory essays have been submitted for publication, with two papers being published at the time of this article's publication.

Wong, Waldrep, and Smith (2007) designed a study to determine if students who served as supplemental instructors (student teacher) would demonstrate measurable academic improvement. Student teachers underwent training to ensure

they were fully prepared to teach and were given a pedagogical manual. The student teachers were required to teach their junior peers and write weekly reports covering their teaching sessions. The researchers then analyzed all students' (student teachers and their classmates who did not participate in the supplemental instructor program) scores on the United States Medical Licensing Examination (USMLE) and each students' final GPA upon medical school graduation. The results of this study showed statistically significant differences where the student teachers had outscored their classmates on the USMLE examination and had earned higher GPA's at the conclusion of medical school.

Using a mixed methods research design, Nestel and Kidd (2005), assessed how participating in a PAL program focusing on patient interviewing skills affected the student teachers. The researchers' quantitative data analysis did not reveal any differences in interviewing skills between students tutors and those students who did not participate in the PAL project, however, the qualitative responses indicated that the peer teachers benefited from their experience. Student tutors particularly noted that they had become more aware of what is expected during the patient interview process.

A randomized, control study done by Nikendei, Andereesen, Hoffman, & Jünger (2009) compared students who acted as peer teachers to students who did not act as peer teachers on ten areas of internal medicine skills. Of the ten skills compared, student tutors performed statistically better in 50%. The authors emphasize that although their study did have some important limitations,

formalized PAL programs are feasible and potentially quite valuable in 'on-ward' education.

Schönrock-Adema, Heijne-Penninga, van Duijn, Geertsma, and Cohen-Schotanus (2007) assessed if medical students would better recognize and display professional behavior after serving as peer assessors. The student assessors were educated in how to assess and classify professional behaviors in their junior classmates. The dependent variable in this study was the professional behaviors demonstrated by the peer assessors following the PAL project. The results of this study did show that peer assessors scored higher on professional behaviors than students who did not serve as peer assessors, but the authors do note that there was most likely a significant learning effect taking place. Although a learning effect is classified as a weakness in a study, in the case of training students to assess their peers, this may eventually be considered a positive outcome of a formalized PAL program.

Buckley and Zamora (2007) recruited volunteer medical students at the University of Birmingham (UK) to act as tutors for junior medical students who were preparing for year-end mandatory standardized exams. The researchers utilized both Likert scale questions as well as open-ended questions to assess how the student tutors felt about serving as peer tutors. Buckley and Zamora's study participants reported that they felt they improved their practical teaching skills, communication skills and were more confident speaking to groups.

## **Athletic Training Instructors and Pedagogical Knowledge**

Craig (2006) conducted a quantitative study to determine how athletic training instructors rated themselves in their knowledge of teaching methodologies as well as their perceived competence in teaching. First, the author notes that upon studying employment announcements advertised by the National Athletic Trainers' Association many employers required teaching as part of a job description, but did not require that applicants actually had any teaching experience. Craig's findings were somewhat surprising in that she found that those athletic trainers who reported having the least amount of 'knowledge' in teaching methodologies actually reported feeling more competent in teaching compared to those respondents who reported having more knowledge of teaching methodologies. Craig suggested that those athletic trainers with more experience in teaching methodologies "were more aware of what they *did not* know about the complexities of each of the 20 TM (teaching methodology) components." The results of Craig's study may suggest that there is a value in exposing ATs to teaching early in their professional development in spite of the author not mentioning or expressing support for PAL in athletic training.

### **Summary**

Although, PAL programs are generally thought to be beneficial to both peer teachers and peer learners, limitations to formalized PAL programs do exist. Tolsgaard et al. (2007), Weidner and Popp et al. (2007), and Bulte et al. (2007) all point out the potential problem that peer teachers may not always have adequate expertise and experience to effectively teach certain skills. It is apparent that most



researchers interested in PAL also share this concern as seen by the overwhelming amount of training that peer teachers were given before being allowed to teach their peers in the contexts of the studies presented in this review. (Burke et al., 2007; Chenot, et al., 2007; Nestel & Kidd et al., 2005; Sengupta, et al., 2007; Tang et al., 2004; Tolsgaard et al., 2007; Wong et al., 2007). Other weaknesses of PAL programs are concerned with peer learners' comfort asking peer teachers questions (Weidner & Popp et al., 2007) and student teachers who also assessed their peers were less likely to give lower grades (Chenot et al., 2007).

Overall, while reviewing the literature on PAL the researcher did not find any studies that concluded that PAL programs should not be implemented. The majority of the authors referenced in this chapter disclosed the limitations of their study designs and offered methods to improve upon PAL programs specifically in the medical education field.

## **CHAPTER 3: METHOD**

### **Introduction: Research Approach and Rationale**

This chapter explains the research methodology and the rationale for the selected methodology. This chapter will also describe the study participants and how they were chosen, the study instrument, and the procedure used to administer the instrument and finally how the data were analyzed.

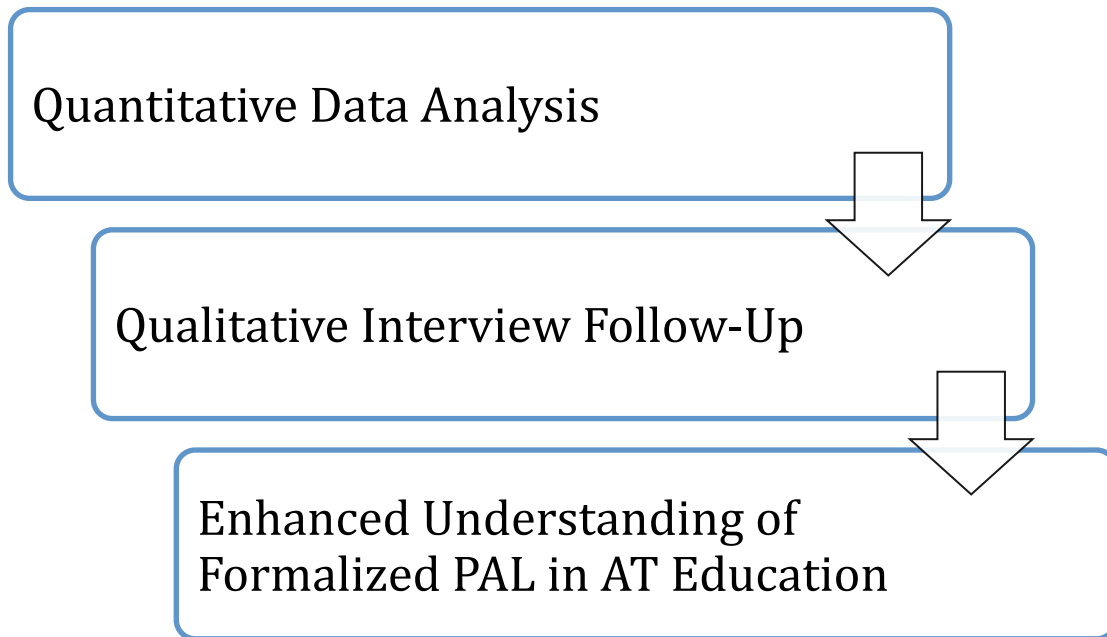
This study was designed using a pragmatic paradigm because the researcher felt that the postpositivist and constructivist paradigms were too restrictive if used alone. Specifically, in regard to epistemology, the researcher did not decide on a data collection method until after the research questions were identified. Using the pragmatic approach allowed the researcher to thoroughly analyze each research question, especially during the pilot testing phase, in order to identify the best and most efficient data collection method to use. After the research questions were narrowed sufficiently to address the problem, the researcher determined that a survey tool would be the best way to answer most of the research questions.

Further utilizing the benefits of the pragmatist research paradigm, the researcher found that a qualitative element was essential in order to try to explain some of the quantitative data, hence the researcher utilized a mixed methods study design.

Regarding axiology, because the researcher had multiple stances, following a pragmatic approach was further solidified (Creswell and Plano, 2007). The

pragmatic research approach parallels the researcher's beliefs and attitudes as an allied health care professional. No two situations can be assumed to be the same. Each situation must be evaluated individually and treated with the tools that best fit at any particular time. Additionally the researcher began this study with a bias of a fundamental belief that participation in a formalized PAL program will enhance ATSS' ability to learn. However, the researcher did not have an opinion in regard to which PAL method works best in various situations. According to Creswell and Plano et al. (2007) the pragmatic research approach supports having a bias toward a particular portion of a research study as well as a neutral view of other aspects of the study.

The researcher chose to answer the research questions utilizing a two-phase mixed methods explanatory design, specifically the follow-up explanations model. According to Creswell and Plano et al. (2007) the follow-up explanations model allows a researcher to collect the quantitative data, analyze the quantitative data and then utilize qualitative methods to help explain the quantitative findings. The researcher used the following steps to complete this study: (a) posted the quantitative survey on SurveyMonkey®, (b) survey was left open for 54 days, (c) the researcher collected and analyzed the survey data, (d) the researcher requested an amended approval from the Colorado State University (CSU) Research Integrity and Compliance Review Office (RICRO) in order to do the subsequent interviews, (e) the researcher conducted four telephone interviews, (f) the researcher analyzed the qualitative data, and (g) finally the researcher used the qualitative data to help explain the quantitative data. Please see Figure 3.1



*Figure 3.1* Schematic of research design.

The quantitative portion of the study was designed as a non-experimental survey utilizing both comparative and descriptive approaches. The researcher chose a survey research design because a survey was an efficient, cost effective tool to collect quantitative data and qualitative information. According to Babbie (1973), “...survey data facilitate the careful implementation of logical understanding.” (p. 45-46). Additionally, Creswell (1994, p. 117) describes how a researcher can use the information gained from a survey to then apply the findings to a larger population. Turocy (2002b) also supports that survey data can be useful in athletic training research because participants may be more likely to give truthful, blunt responses.

Originally, the researcher hoped to recruit interview participants from those individuals that completed the on-line survey. Only one survey participant

volunteered to be interviewed, thus after the quantitative data was analyzed, the researcher contacted five ATEP directors by e-mail to request their participation in 15-20 minute telephone interview. Four of the five ATEP directors agreed.

Conceptually, the researcher felt that using a mixed methods research approach was necessary in order to collect quantitative data to establish certain baselines in regard to formalized PAL use in athletic training education and also allow the study participants the opportunity to explain why PAL is either utilized or not utilized within individual ATEPs. Because of the stringent nature of accreditation, quantitative data are necessary to guide curricular changes in athletic training education. However, collecting qualitative information could not be overlooked because it provided a more comprehensive understanding of the quantitative data in regard to opinions of the effectiveness of formalized PAL programs in athletic training education.

This study was framed using the evidence of the prevalence of PAL, both formal and informal, in other allied health care fields and the theoretical basis of PAL that has given rise to pedagogy in various other educational settings. For example, within disciplines such as K-12 reading and writing, the use of PAL has proven to make a positive, statistical significant difference in a Comprehensive Reading Assessment Battery (Maheady et al., 2006). Students learning from other students will occur unintentionally in most educational settings and Burke et al. (2007) found that when students are taught by their peers they reported a sense of collegiality and understanding that does not seem to exist in traditional professor – student interactions.

## **Human Subjects Review**

The survey instrument and consent form were reviewed and approved by the Colorado State University Research Integrity and Compliance Review (RICRO). Please see Appendix A pages 108 and 109 for copies of the CSU RICRO approval letters. An electronic cover letter served as a consent form before each subject began the interview. Because the researcher had to make adjustments in the original two-phase approach in regard to the interview participants, the researcher submitted an amended application to the CSU RICRO office in order to ensure proper consent measures were completed for the interview phase of this study. Interviewees were contacted via e-mail and given the verbatim consent letter that was approved by the CSU RICRO. Please see Appendix B for copies of the consent letters for both phases of this study.

## **Study Participants**

Three hundred forty-three entry-level ATEP directors (nation-wide) were invited to complete the research study. Study participants' contact information was attained from the CAATE website, caate.net, under the tab: "Accredited Programs". Since the survey instrument was disseminated electronically, study participants were instructed to read a letter of consent that preceded the actual survey. The participants' decision to proceed to the survey served as the consent to participate. Forty-six ATEP directors completed the on-line survey.

Although all 343 ATEP directors nation wide were invited to complete the survey, the generalizability of the study results can only be considered weak since only forty-six (approximately 13%) of ATEP directors are represented in this study.

However, it must be noted that all ATEP directors are charged with implementing a curriculum designed around accreditation standards and although personal characteristics of all directors are different, personal traits were not a variable in the quantitative portion of the study.

ATEP directors also served as observational units (Babbie et al., 1973) regarding the research and survey questions relating to athletic training students (ATs). Equivalence of groups in reference to the athletic training students was moderate because random assignment to groups was not possible. Additionally, there are two types of entry-level ATEPs, one undergraduate and the other Master's degree level. Therefore, age, maturity and life experiences may decrease the overall equivalence of groups between ATs. However, all ATs alluded to graduated from an accredited ATEP and took the national certifying exam for the first time within the 2005 through 2009 academic years. Because ATEPs must be accredited by the CAATE there is a strong homogeneity between ATEP in overall curriculum content in content, but not in pedagogy. An additional reason that equivalence of groups was moderate is, like other allied health care education programs, ATEPs are required to uphold admissions requirements. Though, the admission requirements are not specifically standardized, there are guidelines in place that dictate the overall structure. Taking into account all of the aforementioned considerations, the ATs that were studied were very similar.

In regard to ATEP directors, equivalence of groups was again considered only moderate. The CAATE dictates some basic requirements of all ATEP directors in regard to minimum years of being a Certified Athletic Trainer (ATC) and having full

faculty voting rights. Since the accreditation standards are minimum standards and do not address pedagogy or teaching experience, ATEP directors have varying years of experience as ATCs, as full-time educators and as ATEP directors. Moreover, the directors have varying levels of education because a Master's degree is currently the formal terminal degree in the Athletic Training discipline.

## **Measures**

### **Instrumentation**

A survey instrument was used to collect the quantitative data and follow-up telephone interviews were done to collect the qualitative information. Fourteen quantitative based questions were asked. In order to collect the qualitative data, the researcher had to solicit four ATEP directors to be interviewed. As mentioned previously, since only one survey participant volunteered to be interviewed, the researcher conducted the follow-up telephone interviews with four ATEP directors who did not necessarily participate in the original survey. Please see Appendix B p. 114-118 for a copy of the on-line survey instrument and Appendix D p. 120 for a copy of the pre-determined interview questions.

### **Pilot Testing**

The researcher chose to design and write a survey instrument and thus a pilot study was conducted to determine validity. A group of ATEP directors (n=10) were asked to critically evaluate the survey instrument for question clarity and specificity to the subject matter and six of these ATEP directors returned the pilot study with crucial feedback. ATEP directors are considered to be experts in the athletic training education field. Furthermore, the pilot study participants directly reflect



the final study population. The researcher utilized the comments generated by the pilot test participants to make all necessary changes in order to create a valid instrument.

## **Validity and Reliability**

### **External Validity**

According to Gliner, Morgan, and Leech (2009) external validity of a study is established when “...samples, settings, treatment variables and measurement variables can be generalized beyond the study” (p. 200). Since only forty-six of 343 (13.4%) ATEP directors participated in this study, external validity in regard to population can only be considered weak. External validity concerning ecological issues was moderate since all quantitative questions had concrete answers and no survey questions attempted to measure behaviors or feelings that may be affected by one’s environmental surroundings.

### **Measurement/Construct Validity**

Measurement validity of the survey instrument was established after the researcher completed the pilot study. The participants of the pilot study were ATEP directors, identical to the final survey participants, and they are considered experts in the field of entry-level athletic training education. The feedback the researcher received from the pilot study identified that the survey questions addressed the study subject matter appropriately, concisely, and clearly.

Construct validity was also established after pilot testing the survey instrument. The content experts (ATEP directors) evaluated the survey instrument for question clarity and if the questions adequately addressed PAL in athletic

training education. With the assistance of a research methodologist and utilizing the feedback from pilot study participants, the researcher developed a final survey instrument that was determined to be representative of PAL in athletic training education.

### **Reliability**

The panel of experts who reviewed the survey instrument agreed that questions that had originally been formatted to be open-ended should be changed to Likert-scale questions. The justification for the change from open-ended questions to Likert-scale questions was to increase response rate/avoid blank responses and to have the ability to better quantify the responses. Because the change to Likert-scale questions were made after the pilot testing phase, the reliability of the instrument was not established prior to dissemination of the final survey.

## **Data Collection Procedure**

### **Quantitative Data Collection**

Before formal data collection commenced, a pilot study was completed. Before beginning the survey, each participant read and understood that the CSU RICRO had approved the study. The quantitative survey was administered via SurveyMonkey®, was cross-sectional and anonymous. Each participant had 54 days to complete and return the survey.

### **Qualitative Data Collection**

A sequential data collection method was utilized to gather the qualitative information. According to Creswell and Plano et al. (2007), sequential data collection is useful when researchers are relying on qualitative data to yield a more

in-depth understanding of the quantitative data. Originally, at the conclusion of the quantitative survey, all participants were asked if they would like to participate in the follow-up interview phase of the study; only one participant volunteered. In order to pursue qualitative data, the researcher solicited five ATEP directors via e-mail to be interviewed after the original survey data had been analyzed.

The researcher designed the telephone interviews to include a minimum of four questions that were semi-structured. The interview subjects were asked four questions that aligned with their use of PAL: no PAL utilized, utilization of formalized PAL, or informal PAL only (Appendix D p. 119). The researcher had established questions, but made any necessary adjustments in the order of questions and how the questions were presented. Shank (2006) describes the semi-structured interview as a method to ensure that all critical questions are asked of each participant, but proper latitude is also given to the researcher in regard to order of questioning and the format of question delivery. The researcher transcribed the interview responses during the course of the telephone interviews and frequently clarified wording and meaning with the interviewees.

## **Data Analysis**

### **Quantitative Data**

In order to answer the quantitative research questions the researcher coded the data appropriately for entry into SPSS Graduate Pack™ 16.0 for Mac®, 2007. An exploratory data analysis was done and descriptive statistics were established for research questions: 1a, 1b, 2, 3a, 3b, 4, 5, 6, and 9. Using information and tables provided by Morgan, Leech, Gloeckner, and Barrett (2007, table 6.2) and additional

information found in Myatt (2007, p. 67), the researcher determined that the most appropriate statistic to use for research questions: 1, 3, and 6. Please see Table 3.1.

Table 3.1

*Quantitative Data Analysis*

Research Question (Survey Question #)	Independent Variable	Dependent Variable	Scale of Measure	Statistic
Does participation in a formalized peer assisted learning program increase an ATS's success rate in passing the BOC national certification exam on the first attempt? (1,6)	Participation in a formalized PAL program or not	First time pass rate on the BOC exam	IV: attribute – dichotomous  DV: dichotomous	Independent samples t-test
Is there a difference in the use of PAL and how long an ATEP director has been an educator at the college/university level? (1, 16)	Use of formalized PAL or not	Time ATEP director has been an educator	IV: dichotomous  DV: approximately normal	Independent samples t-test
Is there a difference between an ATEP directors' amount of training in pedagogy/teaching methodologies and the use of formalized PAL in ATEPs? (1,11)	Use of formalized PAL or not	ATEP director's amount of pedagogy training	IV: dichotomous  DV: approximately normal	Independent samples t-test
Are those ATEP directors who report being somewhat comfortable, comfortable, or very comfortable more likely to utilize formalized PAL?	Use of formalized PAL or not	ATEP director's comfort level with PAL	IV: dichotomous  DV: approximately normal	Independent samples t-test

After referencing Morgan et al. (2007, p. 143) the researcher felt that using independent samples t-tests would be the most appropriate statistics in order to determine if a difference existed between two groups in regard to research questions three(b), seven, eight, and ten.

### **Qualitative Data**

To analyze the qualitative data the researcher first used the steps outlined by Creswell and Plano et al. (2007) as a general guide. Due to only having four interview responses to analyze, the researcher was able to compare all responses and identify commonalities and unique points without the use of a codebook. After studying the interview responses, the researcher loosely followed the process of thematic analysis as outlined by Shank et al. (2006). Utilizing an inductive approach the researcher identified one predominant theme and two consistent themes associated with PAL in athletic training education. Finally the researcher decided to use tables to summarize each interviewee's responses.

## **CHAPTER 4: FINDINGS/DATA ANALYSIS**

### **Introduction**

The purpose of this study was to determine the overall role, if any, of formalized peer assisted learning (PAL) in athletic training education. The researcher designed an original survey instrument and invited the 343 athletic training education program (ATEP) directors from ATEPs accredited by The Commission on Accreditation of Athletic Training Education (CAATE) to participate. Following the quantitative data analysis, the researcher conducted four follow-up interviews with ATEP directors who may or may not have participated in the original survey.

The researcher outlined the data collection method for this study in chapter three. Chapter four will include: demographic descriptions of the forty-six survey participants and data analysis for each research question.

### **Descriptive Data of Subjects**

Of the 343 ATEP directors who were invited, forty-six participated in this study. All participants were directors of CAATE accredited ATEPs. Thirty-one of the participants reported having earned a terminal degree (PhD, EdD, DA etc), four reported that they were doctoral candidates at the time of the survey, four defined themselves as doctoral students and seven study participants reported having a master's degree. See Figure 4.1.

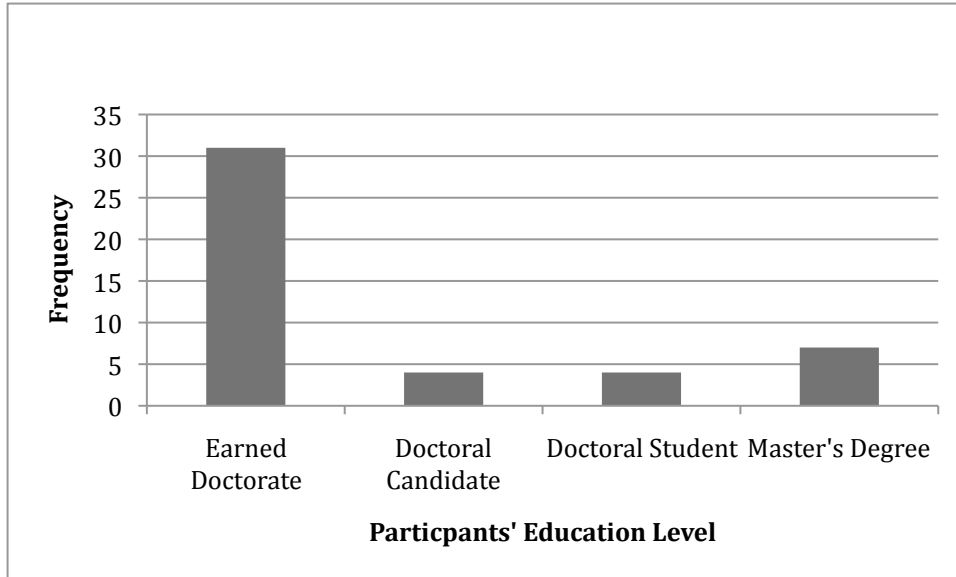


Figure 4.1 Survey participants' reported education level.

The ATEP directors who participated in this study also reported having a range of two to 37 years of experience teaching experience, with a mean of 14.78 years, at the collegiate level. The participants reported having three months to thirty-five years experience as an ATEP director, with a mean of 8.76 years. See Figure 4.2.

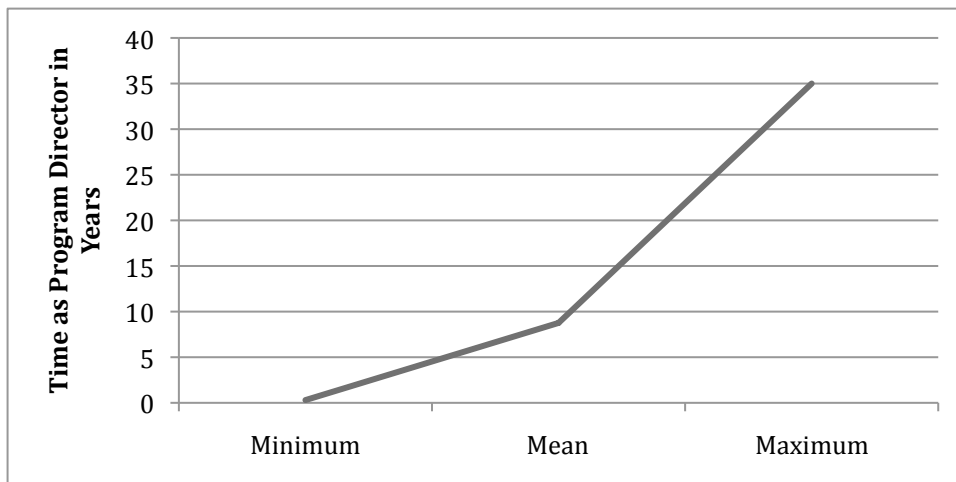


Figure 4.2 Participant reporting of number of years as ATEP director.

The researcher also requested information regarding each participant’s formal educational background/experience in pedagogy. Four participants reported having no background in formal pedagogy training, twelve participants volunteered having pedagogy training via independent study routes (these were not asked for nor specified), eleven survey participants had three to six college/university credit hours of pedagogy course work, eight ATEP directors had seven to twelve college/university credit hours of formal pedagogy training and eleven directors reported having thirteen or more college/university credit hours in pedagogy training. See Figure 4.3.

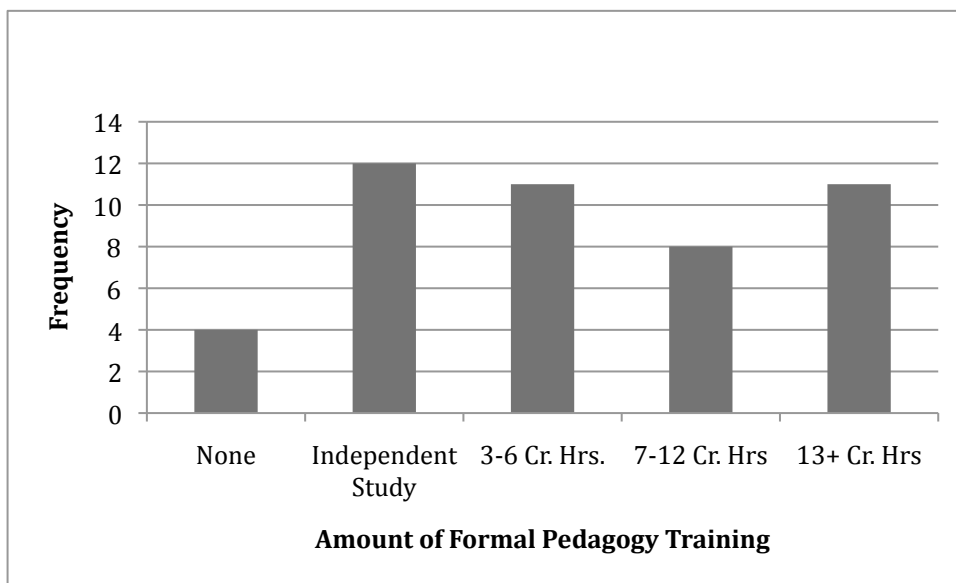


Figure 4.3 Participants’ reporting of formal training in pedagogy.

## Data Analysis

### Research Question #1a

What is the prevalence of formalized PAL in entry-level ATEPs? The survey participants were asked to differentiate whether they were using any type of



formalized PAL, informal PAL, or no PAL during the 2005-06, 2006-07, 2007-08 and 2008-09 academic years. If they were not at their institutions during any of the academic years indicated they were asked to mark ‘not applicable’.

In the 2005-06 academic year ten (21.7%) of the survey participants reported using some type of formalized PAL within their ATEPs (see Table 4.1), in the 2006-07 academic year, eleven (23.9%) of the participants reported using formal PAL (see Table 4.2), during the 2007-08 academic year fourteen (30.4%) of formalized PAL (see Table 4.3) and finally in the 2008-09 academic year, fourteen (30.4%) ATEP directors reported using some type of formalized PAL in their ATEP (see Table 4.4).

The use of informal PAL was the most prevalent response among the ATEP directors who participated. 30.4% during 2005-06, 32.6% in 2006-07, 34.8% during 2007-08 and 41.3% in 2008-09 reported only using informal PAL within their respective ATEPs. Tables 4.1, 4.2, 4.3 and 4.4 further describe the findings regarding the use of PAL by the survey participants. Figure 4.4 illustrates all forty-six responses in regard to the use of PAL within accredited ATEPs.

Table 4.1

*Peer Assisted Learning 2005-06 Academic Year*

	Frequency	Percent
Blank	7	15.2
Formalized	10	21.7
Informal Only	14	30.4
No PAL	7	15.2
Not Applicable	8	17.4
Total	46	100.0

Table 4.2

*Peer Assisted Learning 2006-07 Academic Year*

	Frequency	Percent
Blank	7	15.2
Formalized	11	23.9
Informal Only	15	32.6
No PAL	6	13.0
Not Applicable	7	15.2
Total	46	100.0

Table 4.3

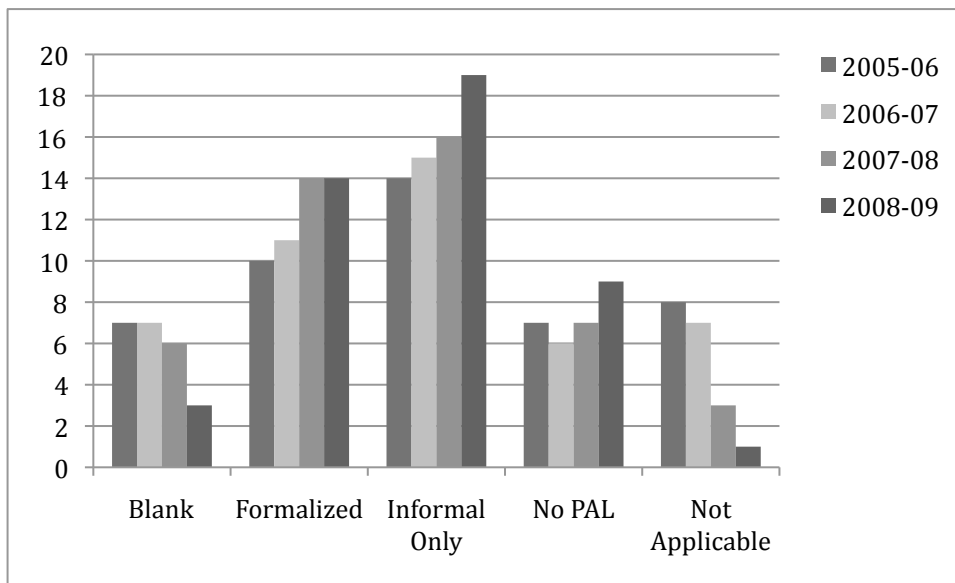
*Peer Assisted Learning 2007-08 Academic Year*

	Frequency	Percent
Blank	6	13.0
Formalized	14	30.4
Informal Only	16	34.8
No PAL	7	15.2
Not Applicable	3	6.5
Total	46	100.0

Table 4.4

*Peer Assisted Learning 2008-09 Academic Year*

	Frequency	Percent
Blank	3	6.5
Formalized	14	30.4
Informal Only	19	41.3
No PAL	9	19.6
Not Applicable	1	2.2
Total	46	100.0



*Figure 4.4 Use of peer assisted learning.*

**Research Question 1b**

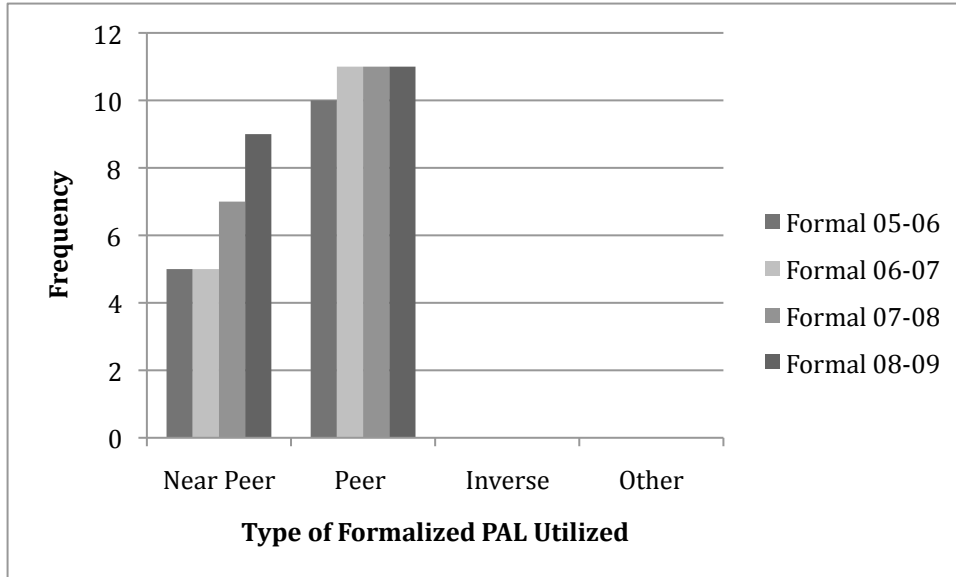
When formalized PAL is utilized, what type of PAL is most frequently used? To further expand upon the use of formalized PAL within ATEPs, the researcher ran a cross tabulation to determine what specific type (survey question #2) of formalized

PAL survey participants were utilizing when they also reported using formalized PAL in any of the four academic years. Table 4.5 and Figure 4.5 graphically display the most common type of PAL used was peer, where the student ‘teacher’ is the same academic year as the student learner. The only other type of PAL that the survey participants reported using was near peer, where the student ‘teacher’ is one or more years senior to the academic year of the student learner.

Table 4.5

*Type of Formalized PAL Utilized by Survey Participants*

	Near Peer	Peer	Inverse	Other
Formal PAL 05-06	5	10	0	0
Formal PAL 06-07	5	11	0	0
Formal PAL 07-08	7	11	0	0
Formal PAL 08-09	9	11	0	0



*Figure 4.5* Type of formalized PAL utilized by survey participants.

## Research Question #2

How familiar are ATEP directors with formalized PAL? The researcher utilized a Likert scale with five options to answer research question nine. Survey participants reported most often that they were minimally familiar with PAL; 28.3% (n=13). The second most frequent response was 26.1% (n=12) of survey participants reporting that they were familiar with PAL. Equal number of participants, 13% (n=6) reported either being very unfamiliar with PAL or very familiar with PAL. Table 4.6 and Figure 4.6, further describe the findings for research question two.

Table 4.6

*ATEP Directors' Familiarity with PAL*

Very Unfamiliar	Minimally Familiar	Somewhat Familiar	Familiar	Very Familiar
6 (13%)	13 (28.3%)	9 (19.6%)	12 (26.1%)	6 (13%)

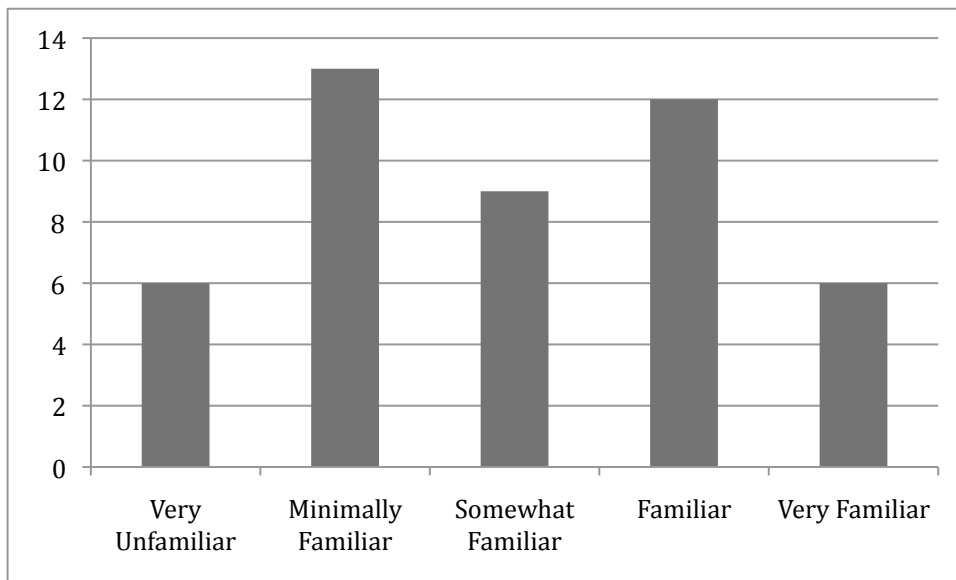


Figure 4.6 ATEP directors' familiarity with PAL.

**Research Question #3a**

How comfortable are ATEP directors using formalized PAL? In order to answer this question, the researcher presented a five option Likert scale to the participants. In regard to comfort utilizing formalized PAL, 10.9% (n=5) reported that they were very uncomfortable utilizing formalized PAL, 34.8% (n=16) of the survey participants reported that they were minimally comfortable, 15.2% (n=7) reported that they were somewhat comfortable utilizing formalized PAL, 23.9%

(n=11) reported being comfortable, and 13% (n=6) were very comfortable using formalized PAL. Table 4.7 and Figure 4.7 illustrate the findings for research question three(a).

Table 4.7

*ATEP Directors' Comfort Level Using Formalized PAL*

Very Uncomfortable	Minimally Comfortable	Somewhat Comfortable	Comfortable	Very Comfortable
5 (10.9%)	16 (34.8%)	7 (15.2%)	11 (23.9%)	6 (13%)

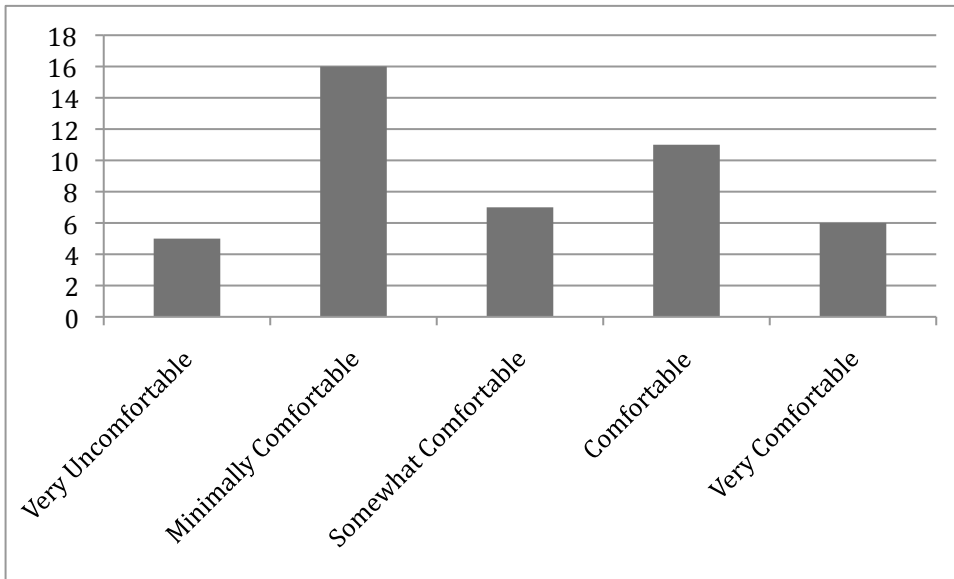


Figure 4.7 ATEP directors comfort level using formalized PAL.

**Research Question #3b**

Research question three(b) emerged after the researcher analyzed the original data set: Are those ATEP directors who reported being somewhat comfortable,

comfortable or very comfortable more likely to actually utilize formalized PAL compared to those survey participants who reported being either very uncomfortable or minimally comfortable? To answer this question, the researcher ran an independent samples t-test using the two aforementioned groups. The researcher did find a logical significant statistical difference between groups separated by comfort level with PAL and actual use of formalized PAL for the academic years 2005-06, 2006-07, and 2008-09; see tables 4.8, 4.9, and 4.11. The researcher set the significance level of  $p < .05$ . During the 2005-06 academic year:  $p = .008$  with an effect size  $d = -.84$ . Using values set by Cohen (1988) this effect size is considered larger than typical. During the 2006-07 academic year:  $p = .003$  with an effect size  $d = -.92$ . According to values determined by Cohen (1988) this is a larger than typical effect size. Finally, during the 2008-09 academic year:  $p = .002$  with an effect size  $d = -1.00$  and according to Cohen (1988) this can be considered a much larger than typical effect size. Additionally, the p value for the 2007-08 academic year (see Table 4.10) was approaching significance:  $p = 0$  and the effect size can also be considered much larger than typical ( $d = -1.24$ ) according to Cohen (1988).

Table 4.8

*Comfort Level Using PAL and Actual Use of Formalized PAL 2005-06*

Comfortable Using PAL	n	Mean	SD	t	df	p	d
No	21	.05	.22	-2.80	43	.008	-.84
Yes	24	.38	.50				



Table 4.9

*Comfort Level Using PAL and Actual Use of Formalized PAL 2006-07*

Comfortable Using PAL	n	Mean	SD	t	df	p	d
No	21	.05	.22	-3.11	43	.003	-.92
Yes	24	.42	.50				

Table 4.10

*Comfort Level Using PAL and Actual Use of Formalized PAL 2007-08*

Comfortable Using PAL	n	Mean	SD	t	df	p	d
No	21	.05	.22	-4.12	43	0	-.1.24
Yes	24	.54	.51				

Table 4.11

*Comfort Level Using PAL and Actual Use of Formalized PAL 2008-09*

Comfortable Using PAL	n	Mean	SD	t	df	p	d
No	21	.10	.30	-3.33	42	.002	-.1.00
Yes	23	.52	.51				

#### **Research Question #4**

What are the opinions of ATEP directors regarding the effectiveness of PAL?

Research question eight was answered via a Likert scale question with the following five choices: very ineffective, minimally effective, somewhat effective, effective, and very effective. Forty of the forty-six survey participants answered this question. The

most frequently checked response was “effective” with twenty-one (45.7%) of forty-five participants answering this way and the least checked response was “very ineffective” with only 1 (2.2%) participant choosing this. Table 4.12 and Figure 4.8 show a graphic representation of all forty-five responses that were given on the survey.

Table 4.12

*ATEP Directors’ Opinions of PAL*

Very Ineffective	Minimally Effective	Somewhat Effective	Effective	Very Effective
1 (2.2%)	3 (6.5%)	10 (21.7%)	21 (45.7%)	5 (10.9%)

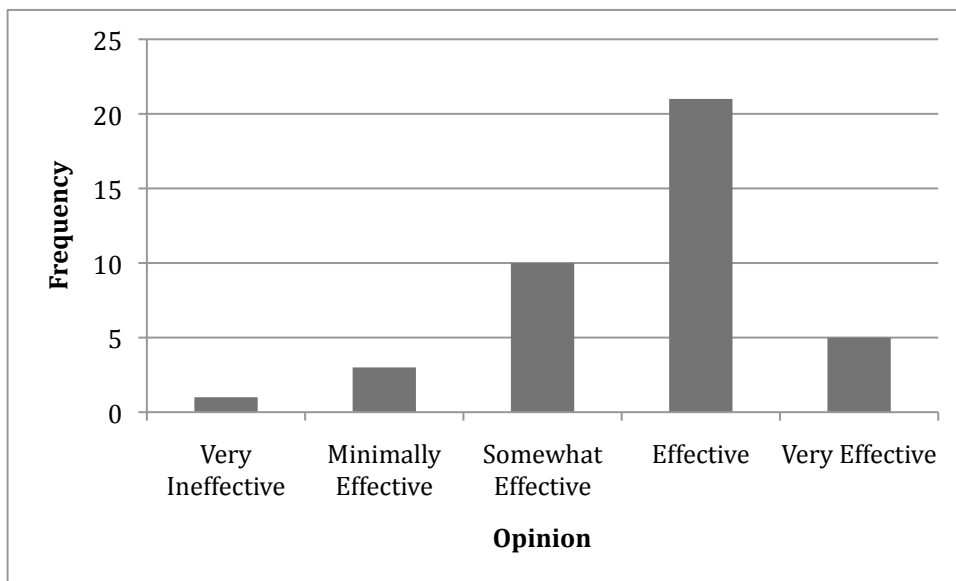


Figure 4.8 ATEP directors’ opinions of PAL.

## **Research Question #5**

What are the motivating reasons that ATEP directors utilize formalized PAL? Survey participants were asked to check all responses that applied to them as they answered research question five. The researcher ran a cross tabulation between the use of formalized PAL and various reasons for using PAL. The researcher ran descriptive statistics to answer question number five. Table 4.13 and Figure 4.9 illustrate that survey participants most frequently utilized formalized PAL to improve student learning. The second most frequent reason that survey participants utilized formalized PAL was to improve student confidence. Four participants who checked “other” listed the following reasons for having a formalized PAL component in their ATEPs: “part of our mentoring program”, “academic advising, academic performance, academic tutoring”, “develop interaction and near peer relationships”, and “allow upper level student to teach (and learn)”.

Table 4.13

*Motivating Factors to Utilize Formalized PAL by Academic Year*

Formalized PAL	n	Improve	Improve	Improve	Other
		Student Confidence	Student Exam Scores	Student Learning	
2005-06	10	7	2	9	1
2006-07	11	8	2	11	1
2007-08	14	11	6	14	2
2008-09	14	10	6	14	2

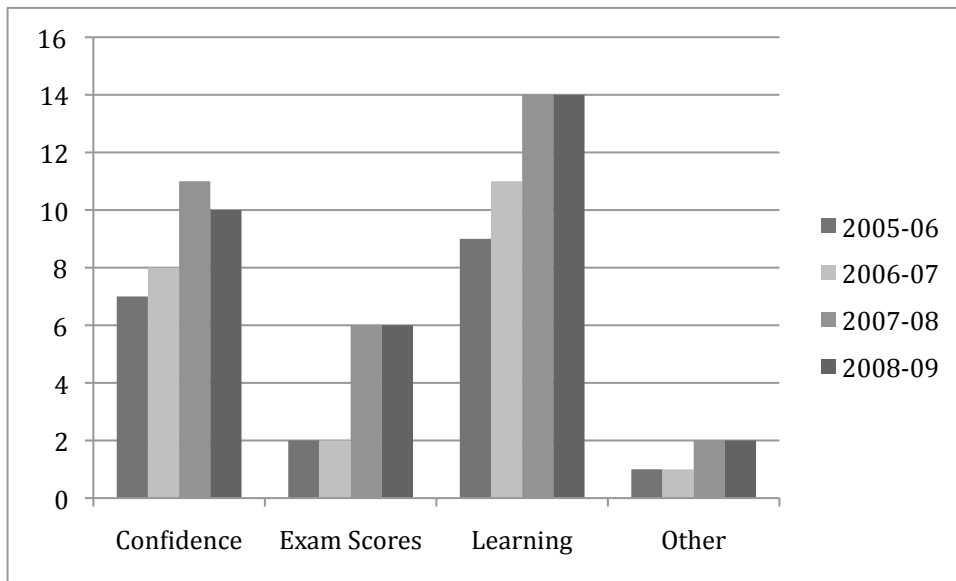


Figure 4.9 Motivating factors to utilize formalized PAL.

**Research Question #6**

What are the reasons that ATEP directors do not utilize formalized PAL? In order to answer this question, the researcher presented five categories of possible

reasons for not using formalized PAL; four categories were defined and the fifth was left open and the participants were asked to check all responses that applied to them. The most frequently selected response for not utilizing formalized PAL was “unfamiliar with technique”. The second most frequently checked response was survey participants choosing that formalized PAL took too much time to integrate into their ATEPs. Those participants who checked ‘other’ volunteered the following information as to why they did not utilize formalized PAL: (a) “never heard of it”, (b) “concerned with CAATE’s interpretation of PAL”, (c) “Not the top priority in program change right now”, (d) “new to the position”, (e) “new program, want to initiate next year”, students are busy and end up forming informal groups on their own, (f) “Combination: the time to sit down learn and implement it administratively, concern of added strain/burden on students for yet more “formal” requirements”, concerned that CAATE does not deem PAL as acceptable, and (g) “not a high priority; tremendous amount of informal PAL on-going and encouraged”. Table 4.14 and Figure 4.10 graphically show the responses to research question six.

Table 4.14

*Reasons PAL Not Utilized*

Unfamiliar with PAL	Dislike PAL	Too Difficult to Assess	Time Consuming	Other
9	0	6	8	9

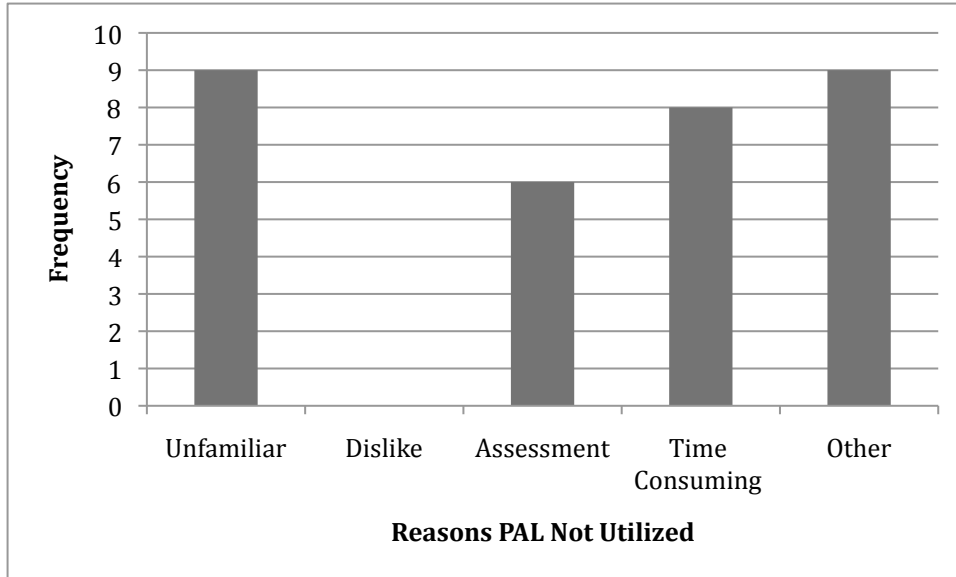


Figure 4.10 Reasons PAL not utilized.

### Research Question #7

Is there a difference between an ATEP director's amount of training in pedagogy/teaching methodologies and the use of formalized PAL in ATEPs? The survey was written with five possible categories of pedagogy training. The researcher then assigned a numeric value to each category as follows: 1 = none, 2 = independent study/continuing education, but no formal course work, 3 = equivalent to 3-6 college/university level credit hours, 4 = equivalent to 7-12 college/university level credit hours and 5 = 13 or more college/university level credit hours. The researcher then ran an independent samples t-test to determine if there was a difference between survey participants in regard to the amount of formal pedagogy training they each had and their use of formalized PAL. A separate t-test was calculated for each of the separate academic years: 2005-06, 2006-07, 2007-08, and 2008-09.

Figure 4.11 demonstrates the overall responses to survey question number nine regarding the amount of pedagogical training each survey participant reported having. The results of the independent samples t-tests are illustrated in tables 4.15, 4.16, 4.17, and 4.18. No statistical significant differences were found between the group that utilized formalized PAL and the group that did not use formalized PAL in regard to the amount of pedagogic training that the participants reported having in any of the targeted academic years. During the 2006-07 academic year, however, the researcher did find a p value approaching significance at  $p = .08$  and an associated effect size of  $d = .67$ . According to Cohen (1988) this effect size is considered medium.

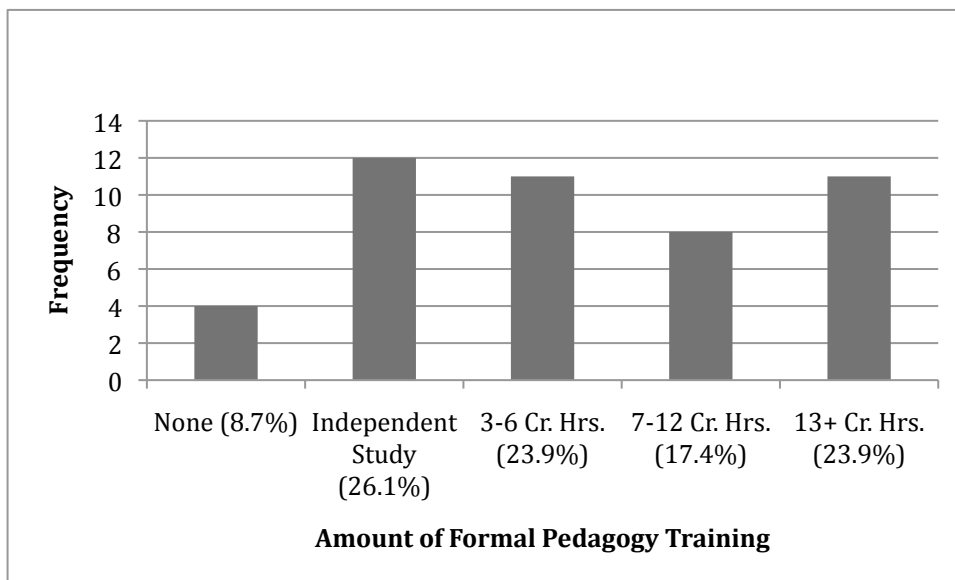


Figure 4.11 Amount of pedagogical training reported by survey participants.

Table 4.15

*Pedagogy Training and Use of Formalized PAL in 2005-06*

Formalized PAL 2005-06	n	Mean	SD	t	df	p
Yes	10	3.5	1.2	0.765	44	0.449
No	36	3.14	1.4			

Table 4.16

*Pedagogy Training and Use of Formalized PAL in 2006-07*

Formalized PAL 2006-07	n	Mean	SD	t	df	p	d
Yes	11	3.8	1.3	1.778	44	0.08	.67
No	35	3.0	1.3				

Table 4.17

*Pedagogy Training and Use of Formalized PAL 2007-08*

Formalized PAL 2007-08	n	Mean	SD	t	df	p
Yes	14	3.4	1.2	0.716	44	0.477
No	32	3.1	1.4			



Table 4.18

*Pedagogy Training and Use of Formalized PAL 2008-09*

Formalized PAL 2008-09	n	Mean	SD	t	df	p
Yes	14	3.5	1.3	0.815	43	0.42
No	31	3.2	1.3			

**Research Question #8**

Is there a difference in the use of formalized PAL and how long an ATEP director has been an educator at the college/university level? The researcher performed four independent samples t-tests (one for each academic year) to compare the group that reported using formalized PAL to the group that did not utilize formalized PAL in regard to how long each participant and been teaching at the college/university level.

The ten study participants who reported using formalized PAL during the 2005-06 academic year had a mean score of 17.50 years teaching at the college/university level. Whereas the thirty-six participants who indicated they did not utilize formalized PAL had a mean score of 14.03 years of college/university teaching experience. No statistically significant difference was found between the ATEP directors who utilized formalized PAL and those who did not in regard to number of years college/university teaching experience during the 2005-06 academic year. See Table 4.19.

Table 4.19

*Use of Formalized PAL 2005-06 and Time Teaching*

Formalized PAL 2005-06	n	Mean	SD	t	df	p
Yes	10	17.5	9.5	1.077	44	0.287
No	36	14.03	8.9			

Eleven survey participants reported using formalized PAL during the 2006-07 academic year and had a mean score of 19.09 years of teaching experience at the college/university level. On the other hand, thirty-five study participants reported not using formalized PAL and they had a mean score of 13.43 years of teaching experience at the college/university level. Although no statistical significance was found between the two groups for the 2006-07 academic year the p value was approaching significance at  $p = .07$ , the effect size ( $d = .45$ ), however could only be considered small to medium according to Cohen et al. (1988). Please see Table 4.20.

Table 4.20

*Use of Formalized PAL 2006-07 and Time Teaching*

Formalized PAL 2006-07	n	Mean	SD	t	df	p	d
Yes	11	19.09	8.9	1.863	44	0.07	.45
No	35	13.43	8.8				

Regarding the 2007-08 academic year, fourteen survey participants reported using formalized PAL and had a mean score of 16.71 years of college/university teaching experience. Thirty-two participants with a mean score of 13.94 years of college/university teaching experience indicated they did not utilize formalized PAL. No statistically significant difference was discovered between the two groups for the 2007-08 academic year. See Table 4.21.

Table 4.21

*Use of Formalized PAL 2007-08 and Time Teaching*

Formalized PAL 2007-08	n	Mean	SD	t	df	p
Yes	14	16.71	8.8	0.958	44	.34
No	32	13.94	9.1			

Fourteen study participants indicated they used formalized PAL during the 2008-09 academic year and had a mean score of 16.93 years of teaching experience at the college/university level. Thirty-one participants reported that they did not utilize formalized PAL and had a mean score of 13.61 years of teaching experience at the college/university level. Again, no statistical difference was found between groups. See Table 4.22.

Table 4.22

*Formalized PAL 2008-09 and Time Teaching*

Formalized PAL 2008-09	n	Mean	SD	t	df	p
Yes	14	16.9	8.7	1.137	43	0.262
No	31	13.6	9.2			

**Research Question #9**

When formalized PAL is used, how often is it used in certain athletic training educational settings? To answer this question, the researcher only used those survey responses that included both use of formalized PAL in survey question one paired with an accompanying response to survey question nine. The researcher asked survey participants to check all settings that they had used formalized PAL and thus the total number of responses in Table 4.23 show the results of this request. A cross tabulation was performed in order to specify those participants who reported using formalized PAL within their ATEPs in certain academic settings. Table 4.23 and Figure 4.12 both show that those participants that utilized formalized PAL used it most frequently in the athletic training lab followed by athletic training clinical education settings.

Table 4.23

*Formalized PAL in Athletic Training Educational Settings*

Academic Year	Lecture	Lab	Clinical	Other
2005-06	4	8	5	1
2006-07	4	8	6	2
2007-08	6	10	8	2
2008-09	6	10	8	2

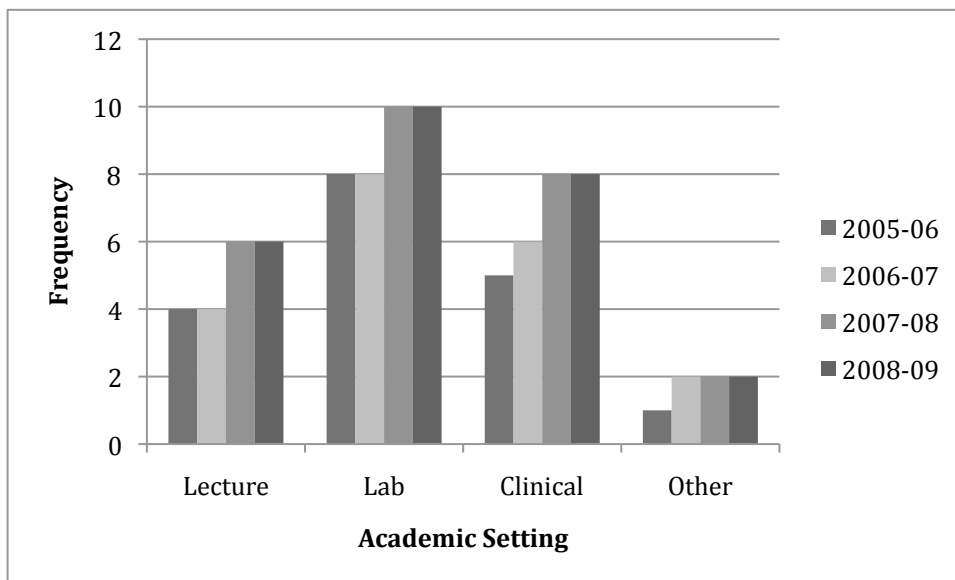


Figure 4.12 Formalized PAL in athletic training educational settings.

**Research Question #10**

Does participation in a formalized PAL program increase an ATS's success rate in passing the BOC national certification exam on the first attempt? To answer this question, the researcher requested information regarding survey participant's use

of PAL as well as first time pass rates as reported by the BOC during the academic years of: 2005-06, 2006-07, 2007-08 and 2008-09. The survey participants had a choice whether or not to share their ATEPs passing rates. Additionally, they had an option to report the exact passing rate or choose a range that best fit their particular program. Eleven (24%) of survey participants opted to not to share any information regarding ATs first time pass rate on the BOC exam. The researcher reported the data as given.

To determine if there was a difference in BOC exam passing rates among athletic training students who participated in a formalized PAL program and those who did not, the researcher calculated two different independent samples t-test for each of the academic years; one test representing the exact passing rates and another representing the passing ranges. The researcher found no statistical significant difference in any of the independent samples t-tests. The researcher created two tables for each academic year, one depicting the exact passing percentage if given and the second representing the general passing percent range if given. Tables 4.24 through 4.35 show all pertinent data associated with each independent samples t-test for each academic year.

Table 4.24

*Formalized PAL vs No Formalized PAL 2005-06: Exact Passing Percent 2005*

Formalized PAL	n	Mean	SD	t	df	p
Yes	4	54.6%	17.5%	-0.286	10.257	0.781
No	14	58.2%	34.1%			

Table 4.25

*Formalized PAL vs No Formalized PAL 2005-06: Passing Range 2005*

Formalized PAL	n	Mean	SD	t	df	p
Yes	5	6.4	1.67	.76	10	0.47
No	7	4.86	4.26			

Table 4.26

*Formalized PAL vs No Formalized PAL 2005-06: Exact Passing Percent 2006*

Formalized PAL	n	Mean	SD	t	df	p
Yes	4	60.6%	43.1%	0.181	16	0.858
No	14	57.2%	30.7%			

Table 4.27

*Formalized PAL vs No Formalized PAL 2005-06: Passing Range 2006*

Formalized PAL	n	Mean	SD	t	df	p
Yes	5	6.4	1.8	.52	12	0.61
No	9	5.67	2.83			

Table 4.28

*Formalized PAL vs No Formalized PAL 2006-07: Exact Passing Percent 2006*

Formalized PAL	n	Mean	SD	t	df	p
Yes	4	46.3%	37.0%	-0.811	16	0.429
No	14	61.3%	31.7%			

Table 4.29

*Formalized PAL vs No Formalized PAL 2006-07: Passing Range 2006*

Formalized PAL	n	Mean	SD	t	df	p
Yes	6	6	1.9	.09	12	0.93
No	8	5.88	2.95			

Table 4.30

*Formalized PAL vs No Formalized PAL 2006-07: Exact Passing Percent 2007*

Formalized PAL	n	Mean	SD	t	df	p
Yes	5	65.6%	29.0%	-0.811	16	0.429
No	13	59.8%	31.6%			



Table 4.31

*Formalized PAL vs No Formalized PAL 2006-07: Passing Range 2007*

Formalized PAL	n	Mean	SD	t	df	p
Yes	6	6.33	2.4	.18	12	0.86
No	8	6.00	4.04			

Table 4.32

*Formalized PAL vs No Formalized PAL 2007-08: Exact Passing Percent 2007*

Formalized PAL	n	Mean	SD	t	df	p
Yes	7	60.7%	37.6%	-0.08	16	0.937
No	11	61.9%	26.4%			

Table 4.33

*Formalized PAL vs No Formalized PAL 2007-08: Passing Range 2007*

Formalized PAL	n	Mean	SD	t	df	p
Yes	5	6.4	2.7	.208	12	0.84
No	9	6.0	3.78			

Table 4.34

*Formalized PAL vs No Formalized PAL 2007-08: Exact Passing Percent 2008*

Formalized PAL	n	Mean	SD	t	df	p
Yes	8	69.4%	13.6%	-1.064	17	0.302
No	11	78.5%	21.0%			

Table 4.35

*Formalized PAL vs No Formalized PAL 2007-08: Passing Range 2008*

Formalized PAL	n	Mean	SD	t	df	p
Yes	5	6.8	2.6	.425	14	0.677
No	11	6.09	3.27			

### **Research Question #11**

How will qualitative data (interview) converge with the quantitative data (derived from research questions 1-10) to help explain the role of PAL, either formal or informal, in athletic training education programs? The researcher successfully recruited four ATEP directors via e-mail to be interviewed after all quantitative data had been collected and analyzed. Because of the small interview sample pool, the researcher was unable to use a formal coding system, but was able to use the data to expand on certain aspects of the quantitative data. All four interviewees reported only using informal PAL in their ATEPs and were all asked the same four questions. Three of the four interviewees stated that they did have the time to implement one more 'thing' into their respective curriculums. Furthermore, the interview

participants also seemed to feel that one more requirement for the athletic training students may simply be unrealistic due to the plethora of competencies and proficiencies that ATs already must master.

Another commonality in the interviewees' answers was the fact that they were not familiar enough with the concept of actually formalizing the PAL that was already occurring in their respective ATEPs. All interviewees were advocates of encouraging informal PAL, but were unsure how to actually implement a formalized program.

Interview participant number one provided an interesting response to interview question number two. Although he stated that he did not utilize formalized PAL in his ATEP, he reported that he does employ an 'arranged' mentoring system between upper and lower classmen. He went on to explain that ATs in his ATEP participate in a somewhat formal workshop prior to his assigning the upper classman mentor with their lower classman mentee. According to the operational definition of formalized PAL, the only aspect that is missing from this mentoring program is a mode of assessment by an instructor. When I asked "Jack" what his overall opinion was of formalized PAL in athletic training education, he stated that utilizing true formalized PAL "adds one more thing to the plate" and his goal was to build a strong culture of informal PAL into his ATEP in order to encourage a sense of collaboration amongst his students without necessarily creating such a prescriptive atmosphere for all learning.

Interview participant number two provided a response to interview question number four that mirrored what current research has demonstrated concerning her

opinion that when an individual is held accountable for teaching something they will inevitably understand that material, not simply memorize it. Please see Tables 4.36 – 4.39 for the summaries of the interviewees' answers.

Table 4.36

*Interviewee #1 (“Jack”) Responses (Informal PAL only)*

<p>Question #1 Have you ever considered implementing a formalized PAL program into your ATEP?</p>	<p>consider it... because of all other requirements may have to eliminate something else, what are we gaining – limited number hours available in curriculum, may not be practical</p>
<p>Question #2 How often do you think that informal PAL does occur within your ATEP and in what situations?</p>	<p>quite a bit – have a mentor system that is ‘arranged’ – evaluate but not strict standards – will have workshop prior to setting up pairings – try to pair accordingly – somewhat structured – work on clinical skills during downtime – lecture material – a “near peer” relationship – very intentional – create a culture, want mentoring culture to be engrained Just don’t want to make it assigned – more collaborative than prescriptive</p>
<p>Question #3 What are your top two or three favored teaching techniques?</p>	<p>Top is: Socratic – throw out question let class go with an answer – then keep going Multiple ways to look at something – encourage multiple discussions Can mix medical history into this technique – what have you considered? act as guide with generalized question, “big on asking questions” *none other discussed</p>
<p>Question #4 What is your overall opinion of utilizing formalized PAL in athletic training education?</p>	<p>“Pro informal” – formalized adds one more thing to the plate too much protocol, “too often reactive in this field” build it into culture informally, a type of glue to link other things together “Athletic Training is an art and science” – informal not jammed down throat – they can see strengths and weaknesses without it being non-threatening because they are not “accountable” – contributes to the “art”</p>

Table 4.37

*Interviewee #2 ("Sally") Responses (Informal PAL only)*

<p>Question #1 Have you ever considered implementing a formalized PAL program into your ATEP?</p>	<p>I have – other places and research showing that PAL actually happens and helps. With informal – those students who like it do it, but those who may benefit, but are shy won't do it Mechanisms and working to get buy in from faculty and students = "one more thing" Informal – with those that take advantage they gain, but others do miss out.</p>
<p>Question #2 How often do you think that informal PAL does occur within your ATEP and in what situations?</p>	<p>Quite a bit – when some were younger they had an 'older' student who helped Faculty then remind them that they received help so they are more likely to help underclassmen  Relatively quite often</p>
<p>Question #3 What are your top two or three favored teaching techniques?</p>	<p>Depending upon level of course: A lot of case studies – helps students make those connections to bigger issues Anatomy – nerves...answers why in a clinical application To a certain extent – group work – presentation, paper, upper level students group presentations to entire ATEP Lectures a lot, but probably not favorite</p>
<p>Question #4 What is your overall opinion of utilizing formalized PAL in athletic training education?</p>	<p>I think it is absolutely essential, though maybe not formal With what we are required to do in athletic training – we HAVE to teach and explain, the more we can do that – formally or informally the better clinicians we will create, regardless of setting athletic trainers TEACH When you teach it, you understand it...helping 5 different people understand – patients and other students – help you to find different ways to explain.</p>

Table 4.38

*Interviewee #3 (“Molly”) Responses (Informal PAL only)*

<p>Question #1 Have you ever considered implementing a formalized PAL program into your ATEP?</p>	<p>Have talked about it – only having a 2 yr program – time is an issue Have not figured out a good way to make it work – due to time constraints  Not comfortable going to 3 yr. program</p>
<p>Question #2 How often do you think that informal PAL does occur within your ATEP and in what situations?</p>	<p>Clinical skills – clinical sites – most have 1<sup>st</sup> and 2<sup>nd</sup> yr students ACI’s use upper students to teach lower as well as students teaching High School students – college students do presentations and workshops Undergrad students also benefit from this At least once a week</p>
<p>Question #3 What are your top two or three favored teaching techniques?</p>	<p>A lot of admin and research courses so - lecture base In class discussion – small group work – case studies that create debate Much rather do student-driven techniques, but classes don’t lend to it happening</p>
<p>Question #4 What is your overall opinion of utilizing formalized PAL in athletic training education?</p>	<p>I think it definitely has a place Sometimes it is harder to implement than doing things as they are Not necessarily a good excuse, but that is how it often happens</p>

Table 4.39

*Interviewee #4 (“Emma”) Responses (Informal PAL only)*

<p>Question #1 Have you ever considered implementing a formalized PAL program into your ATEP?</p>	<p>“No, unfortunately I don’t know enough about formalized PAL”</p>
<p>Question #2 How often do you think that informal PAL does occur within your ATEP and in what situations?</p>	<p>More frequently around quizzing/testing time maybe once a week</p> <p>Often “when I think about it more”</p> <p>Lecture and clinical</p>
<p>Question #3 What are your top two or three favored teaching techniques?</p>	<p>A lot of demo and practice, encourages questions and being prepared</p> <p>Come to class with questions with “muddy points”</p> <p>A lot of hands on even in the middle of lecture</p> <p>No “distinct”/named technique given – expressed liking to encourage class participation – both discussion and practical</p>
<p>Question #4 What is your overall opinion of utilizing formalized PAL in athletic training education?</p>	<p>Would be interested, but informal will ALWAYS have a place</p> <p>Students will always collaborate; those who like it especially will always find a way to work together</p> <p>Formalized sounds intriguing – difficult to implement, would be interested in learning more about it</p> <p>Admitted, just not knowing enough about the “formalized” piece to really answer this question</p> <p>Recommended to researcher that she (the researcher) actually do a workshop at the National Athletic Trainers’ Association Educators’ Conference to discuss topic</p>



## **Summary**

Overall, the researcher found no statistically significant differences for research questions seven, eight, and ten. Even though the findings were insignificant for the independent samples t-tests, they were thought provoking nonetheless because of how many survey participants chose not to give their ATSS first time passing rate on the national exam. Additionally, the researcher found the results of the descriptive statistics to be quite interesting and these findings are discussed in greater detail in chapter five.

In regard to the qualitative data, the researcher was hoping to have a larger sample size, but was not surprised due to the large work load and time constraints of ATEP directors. The data that was collected, however, did provide some explanation for why formalized PAL is not used more frequently in athletic training education. The researcher has expanded on the results from the qualitative data in chapter five.

## CHAPTER 5: CONCLUSIONS/IMPLICATIONS/DISCUSSION

### Introduction

Although the main focus of this study was to learn more about formalized peer assisted learning (PAL) in athletic training education, it also served to emphasize how important it is for all athletic trainers, whether teaching or not, to learn how to teach. According to Ray Castle as cited in Knight (2006):

“I think it is important to understand (and I give this to my students and others) is that not only are we all athletic trainers, all athletic trainers are educators. Regardless of the setting, whether we educate our students, our peers, the public, our patients, whoever, we are all athletic training educators.”  
(p. 16)

The researcher feels that utilizing formalized PAL as a part of an athletic training education curriculum has the potential to positively contribute to athletic training students' (ATs) overall professional preparation. “Sally” from the qualitative phase of this study also emphasized this point by saying, “...regardless of setting, athletic trainers *teach*.” Additionally, the researcher believes that athletic training educators have an obligation to learn about and implement teaching techniques that will result in greater student learning that will ultimately translate into ATs being well prepared to pass the Board of Certification (BOC) national certifying exam. Once again, “Sally” further emphasized this point when she stated, “...when you teach it, you understand it.”

Whether formalized or not, PAL occurs frequently within athletic training education programs (ATEPs) (Henning et al., 2006; Morris et al., 2008). Additionally, Weidner and Popp et al. (2007) and Tolsgaard et al. (2007) found that student teachers were effective in teaching their peers. The researcher of this study sought to establish relationships between the use of formalized PAL and ATEP directors' experiences and whether or not utilization of formalized PAL provided a benefit for ATs in regard to ability to pass the rigorous national certification exam. The results of this study, however, have sparked more questions than answers in regard to PAL and athletic training education. Although the researcher was somewhat disappointed in the overall number of returned surveys (46 of 343), the greater disappointment fell in regard to the eleven participants who reported not utilizing formalized PAL and also chose not to report their ATs' first time passing rate on the national certifying exam. Regardless of the aforementioned disappointments, the researcher feels that this study will fill a small gap in the athletic training education research via highlighting various areas of additional research that are needed in order to continue to improve the quality of athletic training education for ATs.

Chapter five will focus on discussing the findings from this study, further interpretation of the data collected and how it relates back to the current literature, conclusions the researcher has drawn from the data, implications of this study, limitations of this study, the researcher's recommendations for how the findings of this study may impact athletic training education and finally the researcher's

opinion of how further research on the subject of PAL is necessary within athletic training education.

## **Discussion of Findings**

### **Research Question #1a**

Research question one(a) asked how prevalent is the use of any type of PAL within ATEPs. Interestingly, for every academic year about which the researcher inquired, some participants left at least one of the years blank not even answering “not applicable”. Seven participants did not answer for the 2005-06 academic year, seven again did not answer for the 2006-07, six participants chose not to answer for the 2007-08 academic year and three participants did not answer for the 2008-09 academic year. Although it is impossible for the researcher to speculate why survey participants chose not to answer the question, the blank responses potentially impacted all other research questions. Not knowing if these individuals used PAL in any context prevented the researcher from determining if certain relationships existed or not between the use of PAL and the variables of this study.

Regardless of the blank responses for survey question one (in context to research question 1a), the researcher was pleased to see that over the course of the four academic years that the use of formalized PAL within ATEPs increased from 25.6% in 2005-06 to 33.3% in 2008-09.

Another interesting finding from survey question number one and the prevalence of PAL was the number of survey participants who reported that no PAL occurs in their respective ATEPs. Seven participants reported that no PAL was taking place in their ATEP during the 2005-06 academic year, for the 2006-07

academic year, six study participants reported that no PAL was occurring, seven participants reported no PAL in 2007-08 and finally nine survey participants reported that no PAL was occurring in their ATEP in the 2008-09 academic year. Henning et al. (2006) found that when 170 ATs were surveyed 66% of these students reported that some type of PAL indeed occurred in their respective ATEPs.

The findings from this study seem to indicate that ATEP directors and ATs may have much different perspectives regarding the prevalence of PAL. The researcher also serves as an ATEP director and notices informal PAL (in addition to formalized PAL) occurring frequently in all aspects of her ATEP whether it is impromptu group study sessions taking place between class times or ATs practicing clinical skills with each other.

Based upon the current literature as well as personal experience, the researcher is skeptical that PAL is truly absent from any ATEP. Regardless of the researcher's opinion that some type of PAL most likely occurs daily within most ATEPs, this study's results do support and add to the current literature that both formal and informal PAL do occur in health care educational settings (Costello et al., 1989; Henning et al., 2006; Morris et al., 2008).

### **Research question #1b**

Research question one(b) (directly related to survey question number two) proved to be somewhat confusing for the researcher at first. The researcher requested that if the survey participants did NOT utilize formalized PAL to skip survey question two. Unfortunately several of the survey participants misread the

survey instructions and answered question two even if they reported never using formalized PAL.

Regarding those participants who answered using formalized PAL and answered survey question two, the researcher found the results of research question one(b) somewhat surprising. She expected to find those ATEP directors who did use formalized PAL to most frequently use near peer instead of peer according to the operational definitions. Per the operational definitions that were used for this survey near peer is defined as the student 'teacher' being at least one year academically senior to the student 'learner' and peer as both the student 'teacher' and the student 'learner' being the same academic year. During the review of the literature, the researcher found that during experimental studies near peer formalized PAL was used often (Burke et al, 2007; Sengupta et al., 2007; Tang et al., 2004; Ten Cate et al., 2007; Tolsgaard et al., 2007; Weidner & Popp et al., 2007) and the researcher did not find any studies that specifically used peer or inverse as the modes of formalized PAL within a research design. The researcher has considered that survey participants may have misunderstood the operational definitions or did not read them thoroughly before beginning the survey.

The fact that no survey participants reported using the "inverse" method of PAL (where the student teacher is the academic junior to the student learner) was not unexpected, but the researcher would like to speak to a benefit/situation where utilizing the inverse PAL is appropriate. As the field of athletic training continues to evolve and depend upon evidence based practices, often times underclassmen may be getting updated information in certain courses. For example, the researcher

teaches a course in therapeutic modalities to her sophomore level class and the course material is specifically designed around the most current research available. Because of this, sophomores in the researcher's ATEP could be considered more up to date than seniors in regard to this subject and furthermore capable of teaching the seniors.

## **Research Question #2**

Research question two sought to determine how familiar ATEP directors are with PAL as a teaching strategy. The researcher was not surprised with the findings from this question. The majority of survey participants reported being minimally familiar with PAL (n= 13; 28.3%), with the second most frequent response being that ATEP directors were familiar with the use of PAL (n= 12; 26.1%). Six participants fell on either extreme end of the familiarity scale, very unfamiliar and very familiar respectively. Overall 74% of the survey participants fell in the middle of the scale. Additionally, after conducting the follow-up interviews, the researcher found that "Emma" was so unfamiliar with PAL that she expressed that she would not know how to implement such a program, but was interested in the concept.

The researcher found a void in the current literature concerning the subject of instructor familiarity with any certain teaching strategies. Further research in the specific area of determining what teaching strategies ATEP directors actually use and find most effective could prove to be a tool for all athletic training educators as well as support the culture of evidence based practice in the athletic training field. Furthermore, collaboration among athletic training educators concerning effective teaching strategies should be encouraged in order for educators to continue to

improve student learning and ideally seek to improve ATs overall first time passing rate on the BOC national certification exam for athletic trainers.

### **Research Question #3a**

The researcher inquired about how comfortable survey participants were with using PAL in research question three(a). The findings of this research question were quite similar to the findings of research question two. Only five participants reported being very uncomfortable with using PAL (please refer back to Figure 4.7). Upon further investigation into the survey responses, four of the five participants who reported being very uncomfortable with using PAL also reported that there was no PAL (either formal or informal) occurring in their ATEPs and the fifth participant in this category reported the use of informal PAL only. All five of the survey participants who reported being very uncomfortable with using PAL also reported the reason for not using PAL was that they were unfamiliar with the technique.

Although it makes sense that educators would be less likely to use a teaching technique that they are unfamiliar with, the researcher also discovered that of these five survey participants two reported having thirteen or more college/university level credit hours in formal pedagogical training. Considering PAL is not a new teaching methodology (the researcher reported on PAL related literature from as early as 1989), the researcher felt that this particular finding to be odd.

Overall, however, the researcher considers the findings from research question three(a) encouraging. Because the researcher does have a bias toward using PAL, the overall findings suggest that if ATEP directors were exposed to the



benefits of PAL via the current literature and possibly presentations, they may be more likely to incorporate PAL teaching methodologies into their individual curriculums.

### **Research Question #3b**

As mentioned in chapter four, research question three(b) emerged after the researcher analyzed the original data set. This question sought to determine if those survey participants who were comfortable with using PAL did indeed report utilizing formalized PAL within their ATEPs. The researcher did find that during three of the four targeted academic years there was a statistically significant difference in the use of formalized PAL between those ATEP directors who felt comfortable with using PAL and those who did not. The researcher found this result to be quite logical and encouraging.

### **Research Question #4**

The findings from research question four regarding ATEP directors' opinion of the effectiveness of PAL, were also encouraging. Of the forty participants who answered this question thirty-six of them felt PAL was at least somewhat effective (please refer back to Table 4.12 and Figure 4.18). Overall, twenty-six participants (56.6%) felt the PAL was either effective or very effective. The findings from research question four are supported in current literature (Burke et al., 2007; Kassab et al., 2005; Sengupta et al., 2007; Sobral et al., 2002; Tolsgaard et al., 2007; Weidner & Popp et al., 2007).

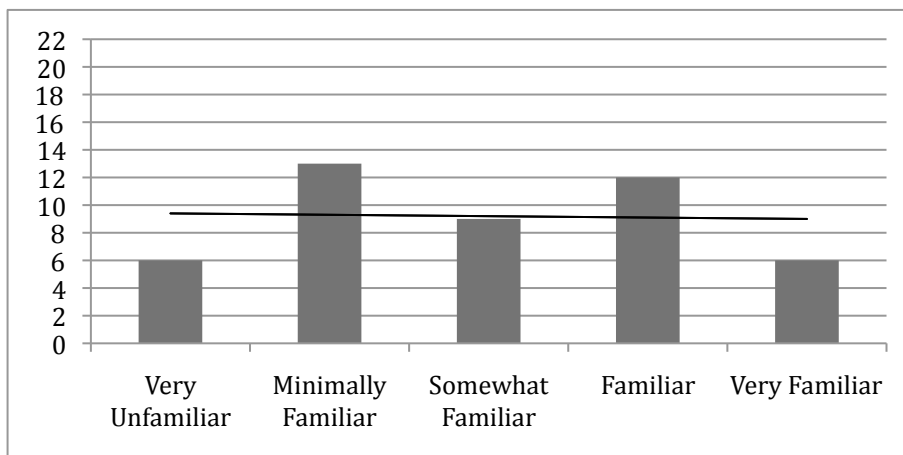
In this study, the researcher chose to focus on only one aspect of the effectiveness of PAL in athletic training education, the first time passing rate on the

national certification exam for athletic training. The results from research question four however, provide strong support for further research in regard to investigating how PAL may impact other athletic training assessments, such as student confidence and clinical skill proficiency, as seen by the work of Henning et al. (2006) and Weidner and Popp et al. (2007).

As athletic training education continues to evolve with other allied health care education, it is imperative that athletic training educators continue to investigate effective means for enhancing student learning. Because literature does support that PAL enhances student confidence and helps to decrease the anxiety associated with school (Buckley & Zamora et al., 2007; Henning et al., 2006; Sengupta et al., 2007; Ten Cate & Durning et al., 2007a; Weidner & Popp et al., 2007), the researcher believes that it would be interesting and beneficial to include ATs and ATEP directors in the same study during future research endeavors. Having both the students' and educators' input simultaneously may allow athletic training educators to see a more complete view of how PAL is used as well as how it is perceived by all stake holders.

Although the researcher found the data associated with research question four encouraging, an inconsistency must be noted. When comparing the results from research question two (ATEP directors familiarity with PAL) with the results from research question four, the researcher noticed a strange issue. The researcher superimposed a 'trendline' using Microsoft Office Excel and discovered that even though survey participants seem to have a fairly horizontal trend in their familiarity with PAL, there is distinct upward trend in their opinions of the effectiveness of PAL.

Please see Figures 5.1 and 5.2. The researcher expected to find the slopes of the trendlines to be much more similar. Upon further investigation of the data, all 46 survey participants answered survey question ten regarding familiarity with PAL whereas only 40 participants answered survey question twelve regarding their opinion of the effectiveness of PAL. Looking back at the survey, the researcher found that two of the six participants who did not answer survey question twelve reported being minimally familiar with PAL and the remaining four participants reported being very unfamiliar with PAL. Because of this particular observation, the researcher can only speculate that there was not a suitable choice for those six participants in regard to the Likert scale offered in survey question twelve.



*Figure 5.1* ATEP directors' familiarity with PAL with trendline (n=46).

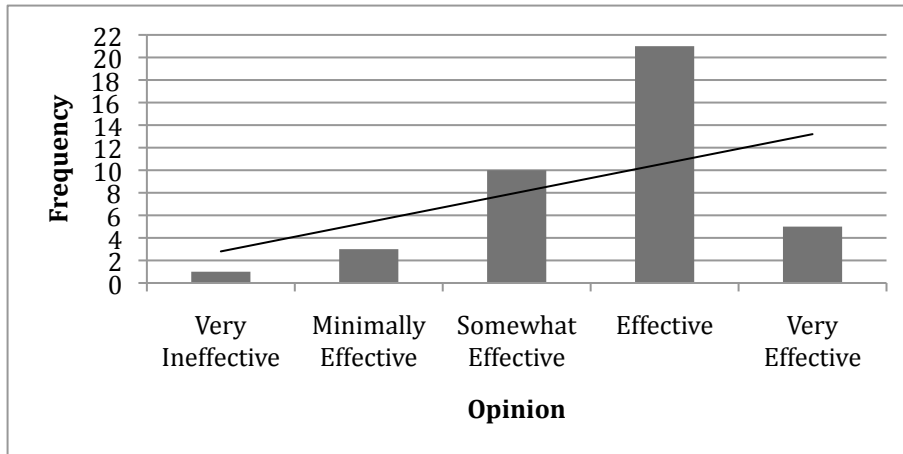


Figure 5.2 ATEP directors' opinion of PAL with trendline (n=40).

### Research Question #5

The findings from research question five regarding the motivations of ATEP directors who do utilize formalized PAL add support to the current literature. The researcher found that the survey participants who utilized formalized PAL consistently were looking to improve student learning (please refer back to Figure 4.9). Whitman and Fife et al. (1998), Ten Cate and Durning et al. (2007a) and Sobral et al. (2002) all suggested that when [medical] students have a responsibility to teach material they learn the material on a deeper level. Ten Cate and Durning et al. (2007a) go on to surmise that students who serve as teachers are intrinsically motivated to learn so as to be perceived to be competent by their peers. The researcher has also witnessed that when students are expected to teach a concept or clinical skill, they tend to be fully prepared and able to answer other student's questions confidently and correctly.

## Research Question #6

Research question six focused on those survey participants who do not utilize formalized PAL; the researcher asked for the reasons why those ATEP directors chose not to utilize formalized PAL. The two most frequent responses (n = 9 for both most frequent responses) concerning research question six were that participants were either unfamiliar with the teaching technique of formalized PAL or they marked “other” (please refer back to Figure 4.10). Considering the early stage of athletic training education research, the researcher did not find it odd that participants were indeed unfamiliar with **using** PAL as an actual teaching technique, however, the researcher did not expect the comments that accompanied the ‘other’ category.

The researcher found one written in response for ‘other’ quite surprising, “Made very clear to us at the educator’s council that it is not an acceptable method of education. Only ACIs [Approved Clinical Instructors] are deemed acceptable for assessing (even in a preliminary way) comprehension and integration of specific skills.” The participant went on to say that their comment was based on twelve-year old information. Another comment concerned the Commission on Accreditation of Athletic Training Education’s (CAATE) interpretation of PAL. These two particular responses made the researcher aware that the survey participants took the operational definitions and the overall structure of the survey in many different constructs.

At no time did the researcher intend to imply that PAL was a method for students assessing students. In the context of this study as well in the reviewed

literature PAL is presented as a teaching technique/strategy used with the intent to enhance student learning. Tolsgaard et al. (2007) and Weidner and Popp et al. (2007) specifically point out that although students had the responsibility to teach, the 'normal' instructor/professor ultimately assessed all students in all aspects of the course material. Furthermore the researcher found the comment regarding the CAATE's interpretation of formalized PAL concerning because the CAATE standards do not dictate pedagogy.

The researcher also asked the four interviewees why they did not utilize formalized PAL in their respective ATEPs and discovered that three of the four participants shared that they felt formalized PAL was too time intensive to implement. Furthermore, the concept of time intensiveness was seen from different levels including: time for instructors to set it up and assess and placing additional time demands on ATSS busy schedules. "Sally" expressed concerns that it may be difficult to get 'buy in' from faculty as well as ATSS if she attempted to impose one more requirement into her ATEP.

### **Research Question #7**

The researcher was interested in research question seven concerning participants' formal pedagogical training and the use of formalized PAL due to the lack of literature regarding ATEP directors experience in this area. The researcher expected to find that those survey participants who had more formal training in pedagogy would also utilize PAL more frequently. Additionally, the researcher was surprised that a combined 34.8% of survey participants reported having none or only independent study in the field of pedagogy. Unfortunately, these findings are

seemingly consistent with the findings of Craig et al. (2006) in regard to how much *teaching* preparation athletic training instructors actually have.

Because ATEP directors ultimately control curricular decisions, the researcher did expect to find fewer ATEP directors who did *not* have formal course work in the field of pedagogy/education. Even though there is not a standard or accreditation requirement concerning an ATEP director's pedagogical or teaching experience, the researcher expected to find that the majority of ATEP directors would have at least 7 – 12 credit hours of formal college/university credit hours since they had chosen to become athletic training educators.

As reported in chapter four, no statistical difference was found between those ATEP directors who utilized formalized PAL and those who did not in regard to the amount of pedagogical training they had completed. Furthermore, although the survey participants' pedagogical training would not be considered normally distributed, it was much more evenly distributed than the researcher expected it to be (refer back to Figure 4.11). Because the findings of this study only represent a small percentage (approximately 13%) of all ATEP directors, it would be interesting to conduct a follow up study focusing on how all Certified Athletic Trainers who function as faculty members are trained or prepared to teach.

Because the first time passing rate on the BOC exam is historically low (CASTLE Worldwide et al., 2003; 2004; 2005; 2006; 2007; 2008) the researcher agrees with Craig et al. (2006) when she states, "... athletic training instructors should learn and practice different strategies and skills to find what best fosters their students' learning." (p. 36). Due to the positive findings regarding formalized

PAL from other allied health education programs, it is the researcher's opinion that it is logical to at least attempt implementing a formalized PAL program if ATs in a particular ATEP are consistently demonstrating a low first time passing rate on the BOC exam.

### **Research Question #8**

After completing a thorough literature review of PAL, the researcher posed research question eight because no studies seemed to focus on *which* instructors were utilizing formalized PAL. With a plethora of variables to choose from, the researcher chose to focus on how long ATEP directors had been teaching at the college/university level. Between research questions seven and eight the researcher attempted to see if there were similarities amongst athletic training educators who utilize formalized PAL as a teaching technique. The researcher did not find any statistically significant difference in regard to number of years teaching at the college/university level and the use of formalized PAL within the current study.

Although the researcher did not find significant differences between the two groups of ATEP directors, those who did use formalized PAL consistently showed slightly more years of teaching at the college/university level (please refer back to Tables 4.19 through 4.22). Again, though this is not a statistically significant finding, the researcher is interested in determining if as athletic training instructors gain teaching experience, they become more comfortable with trying new teaching techniques, especially those techniques that require more time and effort to implement.



## **Research Question #9**

The researcher found the results of research question nine to be in line with the current research regarding in which academic settings instructors utilize formalized PAL (please refer back to Table 4.23 and Figure 4.12). The researcher found that when ATEP directors use formalized PAL, they most often implement it into athletic training laboratory settings and clinical education settings. Many of the studies done to specifically measure the benefits of PAL were designed using either a laboratory setting or clinical education setting (Burke et al., 2007; Sengupta et al., 2007; Tolsgaard et al., 2007; Weidner & Popp et al., 2007). Based on the researcher's experience, the overall nature of athletic training laboratory and clinical education class times are very conducive to implementing formalized PAL.

During laboratory and clinical education classes, ATs are expected to practice skills on each other and the researcher has often noticed true peer teaching (in regard to the operational definition) and learning occurring in these settings. Additionally, since many ATs in the same academic year will complete clinical hours under different approved clinical instructors (ACIs), they will have the opportunity to share their individual (and often quite different) clinical experiences with their classmates, i.e. a unique and efficient method to assess cranial nerves.

Also, although no interview participants utilized formalized PAL, two of the four interviewees, "Jack" and "Sally" also reported that ATs frequently engaged in informal PAL in clinical situations such as practicing orthopedic examinations and basic athletic taping.

## Research Question #10

The researcher found interpreting the findings of research question ten difficult since eleven of the forty-six participants chose to leave all questions blank that directly related to answering this question (survey questions 6 and 7). Additionally, only survey participants that reported not utilizing formalized PAL also answered that they would rather not share their ATs first time passing rate for the BOC exam or they were unsure of their ATs pass rates. Please see figures 5.3 through 5.6.

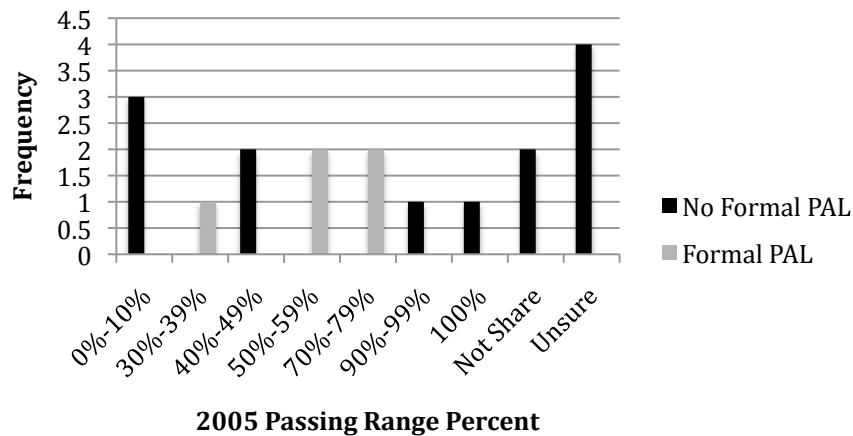


Figure 5.3 Actual reporting of first time passing percent range in 2005.

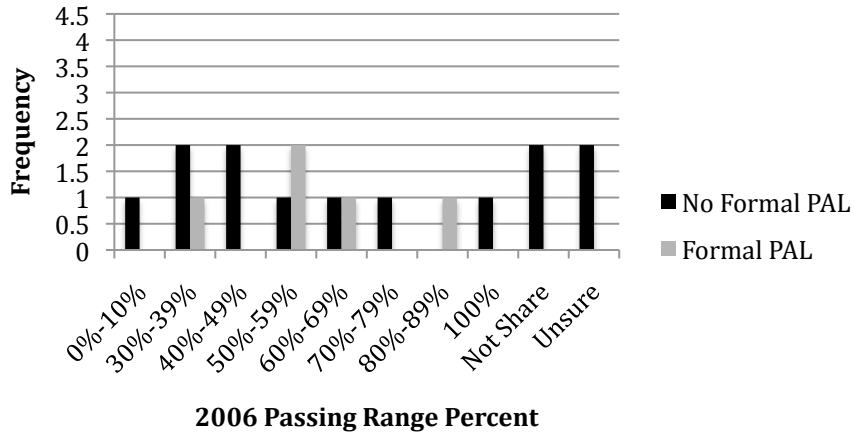


Figure 5.4 Actual reporting of first time passing percent range in 2006.

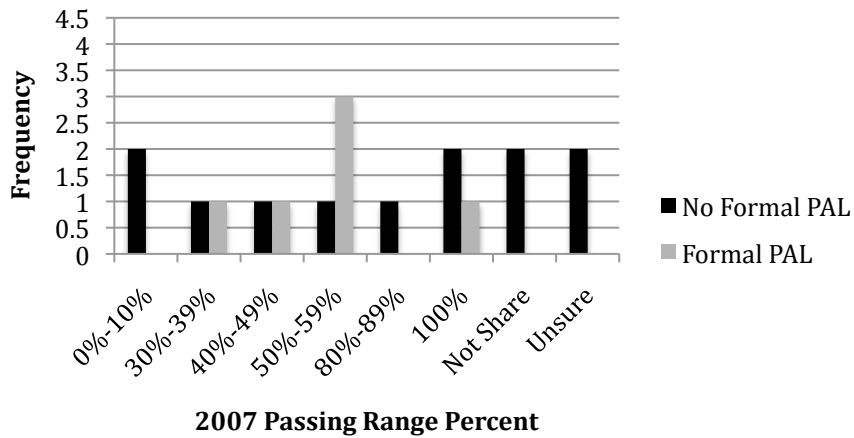


Figure 5.5 Actual reporting of first time passing percent range in 2007.

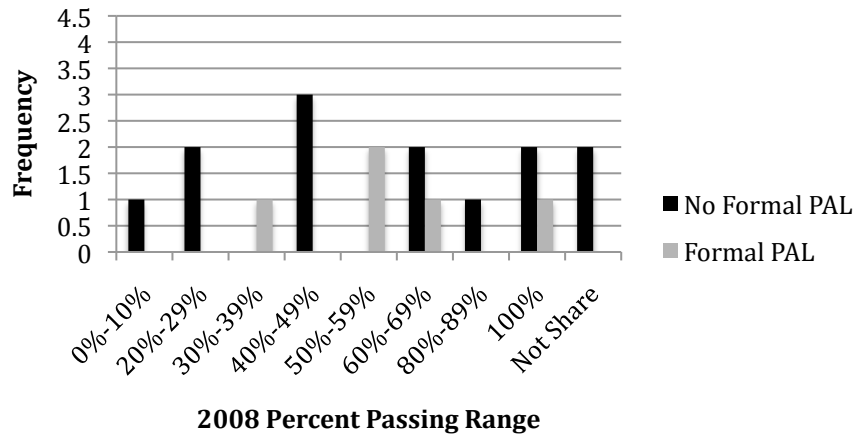


Figure 5.6 Actual reporting of first time passing percent range in 2008.

Unlike Wong et al. (2007), who found that student teachers did outperform student non-teachers on a national, standardized medical licensing examination, this researcher did not find a statistically significant difference in first time passing rates on the BOC exam for ATs who participated in a formalized PAL program and those ATs who did not participate in formalized PAL. Because the researcher did not attain all necessary data to fully answer research question ten, the researcher feels the findings are more inconclusive than statistically insignificant. The researcher can only speculate why survey participants chose not to answer these critical questions; it could have been as simple as they truly did not know where to find their BOC exam reports.

### Research Question #11

Addressing research question eleven proved to be more difficult than the researcher originally thought it would be. The original research survey included an opportunity for survey participants to volunteer to be interviewed after the survey

had closed and the researcher had done the preliminary data analysis. As mentioned previously, only one survey participant volunteered to be interviewed and thus, the researcher made the necessary adjustment to solicit potential interviewees via e-mail. Although the researcher cannot be sure why survey participants did not volunteer to be interviewed she can speculate that they simply did not feel they had the time to take. Since the researcher also holds the same professional position as all of the survey participants, she can attest to the difficulty in finding enough time to get her job duties completed let alone finding time for ancillary requests.

The four interviewees, however, did offer valuable insight into why they did not utilize formalized PAL. “Molly” was particularly candid when sharing that even though she felt formalized PAL has a “place” in athletic training education, “sometimes it is harder to implement [something new] than doing things as they are.” Instead of formalized PAL, “Jack” is determined to create a culture where informal PAL is the norm for his students. He is continually trying to create an ATEP that has an atmosphere of non-prescriptive collegiality via the use of an arranged, though albeit informal, mentoring program.

“Emma’s” responses were quite in line with the finding of Craig et al. (2006) in that she was completely unfamiliar with PAL as a teaching technique. Although she noted that certain students will always gravitate toward helping each other, she had no ideas in how to implement any type of formalized PAL program. She seemed very interested in learning about new teaching techniques that may help her students learn material at a deeper level.

“Molly” shared an opinion much like the researcher’s opinions in addition to further supporting Ray Castle’s statement quoted at the beginning of this chapter. She stated that, “When you teach it, you understand it.” She also believes that all athletic trainers must know how to teach in order to be better clinicians; regardless of the work setting athletic trainers have to teach their patients as well as others involved with a patient’s care.

Overall, due to the small sample of interviewees, the researcher is unable to link the qualitative findings to the quantitative data.

### **Conclusions and Implications**

The researcher was somewhat disappointed in the small number of survey responses, but not surprised due to the time demands placed upon ATEP directors and the overwhelming number of requests they receive for survey participation. The researcher found the results of this study to be interesting and somewhat inconclusive based upon so many of the participants choosing not to answer the most critical question of the survey concerning their ATs first time passing rate on the BOC examination. Despite the small sample size of this study, the researcher was encouraged to see the use of formalized PAL seemed to increase over the span of the four academic years that the study covered.

Regarding research question number ten and attempting to establish a relationship between the use of formalized PAL and ATs ability to pass the rigorous BOC national examination for athletic training, the researcher was disheartened with the number of survey participants who elected not to report their ATEP’s passing rate. Although, the researcher understands the sensitivity of sharing a

program's BOC exam passing rates, the researcher was hopeful that survey participants would see that the overall purpose of asking for this information was to determine if certain teaching techniques may help ATs in their endeavors to become Certified Athletic Trainers. Because of the 24% of survey participants who chose not to divulge their passing rates also reported not using formalized PAL, the researcher feels that the overall results of this question are inconclusive.

In regard to the descriptive statistics, the researcher surprisingly found that the ATEP directors who chose to participate in this study had a much wider range of pedagogical training than was expected. Thirty-five percent of the participants reported having no pedagogical training or only having completed independent study in the area of pedagogy. The researcher found this to be surprising because she expected to see that those ATC's who had chosen to become educators would have elected to learn more about *teaching and learning*. Thus, the researcher feels that the findings of this study also serve to place focus on the relationship between current athletic training education teaching techniques and the overall low first time passing rates for ATs on the national certification exam.

Since the BOC exam is written based directly upon a valid and reliable survey of entry-level certified athletic trainers, the researcher feels that the difficulty of the exam may not be as big of an issue as ATs preparation (or lack of) to pass the exam. Athletic training educators may be seen as the individuals who are truly failing. Those certified athletic trainers who choose to take an active role in teaching ATs must recognize that even though they are content experts, they may not necessarily possess the skill set to be an effective teacher, yet. On the other hand, certified

athletic trainers must have the opportunity to gain these skills. Therefore, the researcher feels that the National Athletic Trainers' Association could play a larger and more active role in organizing and promoting continuing education activities with a pedagogical focus.

Because the researcher asked several questions that were not addressed in the current athletic training education literature, the researcher feels that this study may serve as a foundation for further research in the area of effective pedagogical techniques utilized in athletic training education. For instance the researcher would now like to know what are the preferred teaching techniques of ATEP directors, what teaching techniques do they most frequently employ and how often do they attempt to introduce new teaching strategies into their classes. As mentioned previously, the athletic training profession as a whole is committed to evidence based practice in teaching and clinical work, hence athletic training educators do have an obligation to pay attention to pedagogical research in order to ensure that we are employing effective teaching strategies to continue to meet the needs of ATSS.

Although the researcher cannot say that there will be direct implications to athletic training education based on the findings of this study, she is hopeful that this study will entice others to investigate the effectiveness of teaching methods utilized by athletic training educators. Furthermore, the researcher is also hopeful that with the new emphasis being placed on quality athletic training education more athletic training educators will begin to practice evidence based teaching in addition to teaching the importance of evidence based clinical practices.



Ultimately, athletic training educators must fulfill their obligation to ATs to remain current with educational research as Craig et al. (2006) states, “Not only do Athletic Training Education Program (ATEP) instructors need to be knowledge experts in the field of athletic training, they must also be able to effectively teach that knowledge.” (p. 28).

Based on the findings from the literature on formalized PAL reported on in chapter two as well as the findings from this study, the researcher feels that participating in a formalized PAL program may contribute to an ATs professional development in two primary ways: (a) provide a means to learn material at a deeper level, and (b) provide an introduction to teaching in order to be able to communicate effectively as an allied health care professional.

### **Study Limitations**

An obvious weakness of this study was the small sample size of forty-six survey participants. Although the researcher was hoping for a sample size closer to one hundred, she understands that ATEP directors are inundated on a weekly basis with multiple invitations to participate in research surveys and they cannot possibly participate in every one.

As the researcher first analyzed the data and ran descriptive statistics another weakness became evident. It appears that survey participants did not fully read the survey instructions. Eleven survey participants who answered that they did not use formalized PAL in one or more years went on to answer survey questions two, three, and four instead of skipping to survey question number five as the researcher requested. To rectify this situation in regard to running appropriate statistics, the

researcher was able to code the variables into SPSS ® such that only those participants who indicated that they utilized formalized PAL were then associated with survey questions two, three, and four. Based on this finding the researcher feels that even though surveys are an exceptional method of collecting data, a researcher will always have to make the proper adjustments based upon how survey participants read and interpreted the survey as a whole.

A limitation of the survey instrument became evident after the researcher analyzed the data regarding survey question twelve. The researcher should have written the Likert scale question to include a choice of “no opinion” in order to give all participants an appropriate choice.

An additional limitation of this study was that the researcher designed this study anticipating that at least five survey participants would agree to be interviewed following the survey data collection and initial analysis, however, only one participant volunteered. Since the researcher still felt it was necessary to attempt to collect some qualitative data, she recruited a small convenience sample (n=4) of colleagues (fellow ATEP directors) to interview regarding their opinions of PAL within accredited ATEPs. Since the researcher had no way of knowing if the interview participants participated in the original survey, linking the quantitative data to the qualitative data cannot necessarily be done.

The researcher feels that survey research as a whole presents many limitations and challenges. Survey research has been found to be an exceptional method of collecting data in many fields including athletic training (Babbie et al., 1973; Turocy et al., 2002b), but many aspects of this type of research are impossible

to control such as participants' personal perception/interpretation of the survey questions and overall response rate.

Finally, the researcher feels her lack of experience in conducting interviews was a substantial limitation to the qualitative phase of this study, albeit a small portion of this study. Although the researcher attempted to draw more detail from the interviewees as they were answering questions, it was apparent that the researcher was a novice in this area.

### **Need For Additional Research**

Regardless of the limitations of survey research, the researcher does feel that survey data is necessary in order to establish certain baselines or trends within a field of study such that other studies can be designed effectively to address the needs at hand. For example, this study helped to establish the need for discovering which teaching methods athletic training educators *are* using and if there is a relationship between those methods and the low overall first time passing rate on the BOC exam for certifying athletic trainers. Alternatively, this type of research may also help to identify which teaching methods are proving to be effective within athletic training education in regard to success in passing the BOC exam.

Based upon the findings of this study as well as the findings of Craig et al. (2006), ATEP instructors' training in pedagogy appears to be lacking. Further research in regard to athletic training educators' willingness to participate in activities/courses focusing on *learning* about different types of teaching methods and how to implement new teaching methods could help guide the members of the

National Athletic Trainers' Association Executive Committee for Education in providing those types of continuing education opportunities.

In conclusion, even though the researcher did not find statistically significant results, the results of this study did show certain athletic training education trends as well as point out potential deficits in how athletic training education is being delivered. After speaking to "Emma", the researcher has begun to investigate the possibility of designing a presentation for the National Athletic Trainers' Educator's conference that would also double as a means to collect data from participants in regard to knowledge of and use of teaching methodologies. In regard to ATs success in passing the BOC exam on the first attempt and participation in a formalized PAL program, the researcher sees the need to investigate research question ten again.

The researcher will continue to utilize a formalized PAL program in her ATEP. Although not part of this study, the researcher would like to share statements from her ATs regarding their opinions of formalized PAL. The following quotes are from the researcher's ATs: (a) "it [PAL] really makes you study, the sophomores hang on every word you say."; (b) "as much of a pain as it [PAL] was, I feel like it helped me when I was studying for my [BOC] exam."; and (c) "I hated it at first, then I found I did not have to re-study some material before I took a test." The researcher firmly believes in the concept of PAL and how it will ultimately prepare ATs to become more qualified certified athletic trainers.

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## **APPENDICES**

**APPENDIX A: HUMAN SUBJECTS COMMITTEE APPROVAL**

**DATE:** November 23, 2009  
**TO:** William Timpson, Education  
Christine Odell, Education (Metro State-Human Performance & Sport)



**FROM:** Janell Barker, IRB Administrator  
Research Integrity & Compliance Review Office

**TITLE:** Does Participation in a Formalized Peer Assisted Learning Program Impact an Athletic Training Students' Initial Performance on the Board of Certification National Exam for Athletic Training?

**IRB ID:** 080-09H                                      **Review Date:** November 23, 2009

The Institutional Review Board (IRB) Administrator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(1): Research conducted in established or commonly accepted education settings, involving normal education practices..... The IRB determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as proposed in the Exempt application**, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.
- **Any modification of this research should be submitted to the IRB through an email to the IRB Administrator, prior to implementing any changes**, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.
- **Please notify the IRB if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB may make the determination of exemption**, even if you conduct a similar study in the future.

**DATE:** June 28, 2010

**TO:** William Timpson, Education  
Christine Odell, Education



**FROM:** Janell Barker, IRB Administrator  
Research Integrity & Compliance Review Office

**TITLE:** Does Participation in a Formalized Peer Assisted Learning Program Impact an Athletic Training Students' Initial Performance on the Board of Certification National Exam for Athletic Training?

**IRB ID:** 080-09H                      **Review Date:** June 28, 2010

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The Institutional Review Board (IRB) Administrator has reviewed the modification of this project (to add more participants via email using the revised email and cover letter) and has declared the study remains exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2). The IRB determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as proposed in the IRB application**, including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.
- **Any modification of this research should be submitted to the IRB through an email to the IRB Administrator, prior to making any changes**, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.
- **Please notify the IRB if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB may make the determination of exemption**, even if you conduct a similar study in the future.

**APPENDIX B:**  
**COVER LETTERS FOR ON LINE SURVEY AND FOLLOW UP INTERIVEWS**

Dear ATEP Director,

My name is Christine Odell and I am a doctoral candidate at Colorado State University in the School of Education. We are conducting a research study to determine: the prevalence of formalized peer assisted learning (PAL) in accredited athletic training education programs, if participation in a formalized PAL program is beneficial for athletic training students and what are the factors that determine whether a formalized PAL program is utilized in an accredited ATEP. The title of our project is Peer Assisted Learning in Athletic Training Education. The Principal Investigator is Dr. William Timpson, School of Education and the Co-Principal Investigator is doctoral candidate, Christine Odell, MA, ATC

We would like you to take time to complete the attached electronic survey. Participation will take approximately 15 minutes. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

All survey results are anonymous. If you choose to participate in a follow-up telephone interview, your identity will remain confidential via the use of coded identities following the interview. While there are no direct benefits to you, we hope to gain more knowledge on effective teaching methodologies in athletic training education.

There are no known risks with participation in this research study. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

This study has been approved by the Colorado State University Research Integrity & Compliance Review Office. If you have any questions, please contact Christine Odell at 303-556-3148 or codell6@mscd.edu or Dr. William Timpson at 970-491-7630 or timpson@cahs.colostate.edu. If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Human Research Administrator, at 970-491-1655.

Please click on the link below to enter the survey.

Sincerely,

William Timpson, PhD  
Advisor

Christine Odell, MA, ATC  
Doctoral Candidate

Dear ATEP Director,

My name is Christine Odell and I am a doctoral candidate at Colorado State University in the School of Education. We are conducting a research study to determine: the prevalence of formalized peer assisted learning (PAL) in accredited athletic training education programs, if participation in a formalized PAL program is beneficial for athletic training students and what are the factors that determine whether a formalized PAL program is utilized in an accredited ATEP. The title of our project is Peer Assisted Learning in Athletic Training Education. The Principal Investigator is Dr. William Timpson, School of Education and the Co-Principal Investigator is doctoral candidate, Christine Odell, MA, ATC.

I would like to ask if you would be willing to participate in a short telephone interview in order to gather more in-depth information regarding Peer Assisted Learning within CAATE accredited Athletic Training Education Programs. Our interview would last approximately 15 – 20 minutes. Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty.

Your identity will remain confidential via the use of coded identities following the interview. While there are no direct benefits to you, we hope to gain more knowledge on effective teaching methodologies in athletic training education.

There are no known risks with participation in this research study. It is not possible to identify all potential risks in research procedures, but the researcher(s) have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

This study has been approved by the Colorado State University Research Integrity & Compliance Review Office. If you have any questions, please contact Christine Odell at 303-556-3148 or [codell6@mscd.edu](mailto:codell6@mscd.edu) or Dr. William Timpson at 970-491-7630 or [timpson@cahs.colostate.edu](mailto:timpson@cahs.colostate.edu). If you have any questions about your rights as a volunteer in this research, contact Janell Barker, Human Research Administrator, at 970-491-1655.

Please keep a copy of this letter for future reference.

Sincerely,

William Timpson, PhD  
Advisor

Christine Odell, MA, ATC  
Doctoral Candidate



**APPENDIX C: ON LINE SURVEY INSTRUMENT**

## Survey of ATEP Directors

In order to establish solid quantitative data, the researcher humbly requests that you use your BOC exam reports for 2005 – 2008 to complete a table.

Please use the following operational definitions to complete the survey:

### **Formalized Peer Assisted Learning (PAL) Program =**

An academic requirement within an accredited ATEP where athletic training students are given the opportunity to be held accountable for teaching their peers. The program may be voluntary or curriculum wide, but once in the program the peer teacher must have had training beyond the peers they are teaching and additionally there must be an assessment of the peer teaching that takes place.

**Informal (Unintentional) PAL** = Peer assisted learning occurs randomly throughout the course of the ATEP curriculum, however, there is no formal assessment of the teaching and learning that occurs under PAL circumstances

**No PAL** = No peer assisted learning activities occur within the context of the ATEP

### Types of Peer Assisted Learning

- 1) Near Peer = 'teacher' is one or more academic year(s) senior to the learner's academic year
- 2) Peer = 'teacher' is the same academic year as learner
- 3) Inverse = 'teacher' is actually one academic year junior to those they teach

Survey Questions:

1) During the last four academic years, has PAL been utilized either formally or unintentionally within your ATEP? Please mark your response in the box under the appropriate category. If you were not at your current institution during any of the selected academic years, please mark N/A.

	Formalized PAL	Informal PAL Only	No PAL	N/A
2005 - 06	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2006 - 07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2007 - 08	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2008 - 09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**IF YOU HAVE NEVER UTILIZED FORMALIZED PAL, PLEASE SKIP TO QUESTION #5 and finish the remainder of the survey.**

2) If you have utilized a formalized PAL in any of the past four academic years, using the definitions of PAL methods, which one(s) did you utilize in each academic year? Please mark all that apply.

	2005 - 06	2006 - 07	2007 - 08	2008 - 09
Near Peer				
Peer				
Inverse				
N/A				

3) Please indicate the athletic training educational settings that formalized PAL was used. Please check all that apply.

- Lecture/Classroom
- Formal lab instruction
- Clinical site
- Other

4) WHY have you utilized a formalized PAL program in any of the past four academic years? Please check all that apply.

- Improve student confidence
- Improve student exam scores
- Improve student learning
- Other, please explain:

5) If you have never utilized a formalized PAL program, why not? Please check all that apply.

- Unfamiliar with technique
- Do not like the technique
- Too difficult to assess
- Time consuming
- Other, please explain:

6) Please use your BOC exam reports and fill in the first time passing rate for your ATEP during each year identified if possible. If your exam reports are unavailable, or you would rather not disclose this information, please check the box that is most appropriate for your program

	2005	2006	2007	2008
Exact Passing Rate Percentage				
<b>IF exact percentage is not available, please check one of the following:</b>				
0% - 10%				
11% - 19%				
20% - 29%				
30% - 39%				
40% - 49%				
50% - 59%				
60% - 69%				
70% - 79%				
80% - 89%				
90% - 99%				
100%				
I would rather not share this information				
Unsure				

7) How long have you been teaching at the college/university level?

\_\_\_\_\_ years \_\_\_\_\_ months

8) Before you began teaching, how would you describe your knowledge base in basic pedagogy/teaching methodologies?

- None
- Independent study or continuing education, but no formal course work
- Equivalent to: 3 – 6 college/university level credit hours
- Equivalent to: 7- 12 college/university level credit hours
- 13 or more college/university level credit hours

9) What is your level of familiarity with PAL?

1	2	3	4	5
Very Unfamiliar	Minimally Familiar	Somewhat Familiar	Familiar	Very Familiar

10) What is your comfort level in utilizing PAL?

1	2	3	4	5
Very Uncomfortable	Minimally Comfortable	Somewhat Comfortable	Comfortable	Very Comfortable

11) What is your opinion regarding the effectiveness of PAL?

1	2	3	4	5
Very Ineffective	Minimally Effective	Somewhat Effective	Effective	Very Effective

12) Which one of the following best describes your current level of education?

- Earned Doctorate (PhD, EdD, DA etc)
- Doctoral Candidate
- Doctoral Student
- Masters Degree

13) How long have you served as an Athletic Training Education Program Director?

\_\_\_\_\_ years      \_\_\_\_\_ months

Would you be willing to participate in a follow-up telephone interview with the author of this survey? Your identity will continue to be protected via the use of a coded false name.

If you are willing to be interviewed please click on the link below to the researcher's e-mail address. Please enter "interview" in the subject line and leave your preferred contact information. The electronic link will not be attached in any way to the original survey.

## **APPENDIX D: INTERVIEW QUESTIONS**

## Qualitative Interview: Pre-Determined Questions

### **Set #1 – If formalized PAL is used:**

**Interview question #1:** If you have utilized a formalized PAL program, how did you accomplish this? What type of PAL is used?

**Interview question #2:** If you utilize a formalized PAL program, please explain how you prepare the peer teachers for the experience?

**Interview question #3:** What, if any, positive changes have you noticed in the academic and/or clinical performance of the peer teachers?

**Interview question #4:** What is your opinion regarding the time benefit ratio of implementing a PAL program?

### **Set #2 – If PAL is NOT used at all:**

**Interview question #1:** Would you ever be interested in implementing a formalized PAL program in your ATEP?

**Interview question #2:** What other types of learning strategies do you currently use?

**Interview question #3:** After taking the survey, are you at all interested in learning more about PAL in athletic training education?

**Interview question #4:** What is your overall opinion of PAL in athletic training education?

### **Set #3 – If only informal PAL is used:**

**Interview question #1:** Have you ever considered implementing a formalized PAL program into your ATEP?

**Interview question #2:** How often do you think that informal PAL does occur within your ATEP and in what situations?

**Interview question #3:** What are your top three favored teaching techniques?

**Interview question #4:** What is your overall opinion of utilizing formalized PAL in athletic training education?