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# Addressing Myths and Questions Pertaining to Publishing in Open Access Journals

William A. Pitney, EdD, ATC, FNATA

Northern Illinois University, DeKalb, IL

Open access journals refer to scholarly publications freely available to readers on the internet. The advent of open access journals in the early 1990s found the majority of publications associated with small scale groups of scientists and educators.<sup>1</sup> The times have changed considerably. Now, a vast number of scholarly publications are available both in print and electronically, and there are over 5,000 publications in the Directory of Open Access Journals (DOAJ).<sup>2</sup> I am pleased to announce that as of 2010 the *Athletic Training Education Journal* (ATEJ) is now among those included in the DOAJ.

I recently attended some focus groups regarding institutional repositories with other scholars on my campus, and open access journals were discussed. I found that some misconceptions exist related to open access journals. I then examined some literature related to these common misconceptions and found that although publishing in open access journals is widespread, some myths and questions continue to surface. The key myths concern the peer review process<sup>3</sup> and quality of publications.<sup>4</sup> The key questions include “Will readers find and cite my work that I publish in an open access journal?” and “do I have to pay for publishing in an open access journal?” The purpose of this editorial is to address these myths and answer these questions.

## Myth #1: Open access journals are not peer reviewed.

In a 2005 study of authors who submitted to the *British Medical Journal* (BMJ), many respondents assumed that publishing in an open access journal meant doing so without peer review.<sup>4</sup> Perhaps when open access journals first appeared on the internet many were perceived as a path of least resistance for publishing. Indeed authors could easily have created an on-line repository to place non-peer reviewed manuscripts making them accessible to all. However, all major open access initiatives concur that open access is to remove price and accessibility barriers, but not the

peer review process.<sup>3</sup> One criterion for listing a publication in the DOAJ and other similar directories is, in fact, that the journal be peer reviewed.<sup>5</sup> This is consistent with the Budapest Open Access Initiative (BOAI) guidelines.<sup>6</sup> There may be some open access journals available to readers that are not peer reviewed, but these would not be listed in directories following the BOAI guidelines.

## Myth #2: Open access journals lack quality

The quality of open access journal publications appears to be a concern for many potential authors.<sup>3,4</sup> Maybe this concern is borne from belief in myth #1, or perhaps issues of quality are conflated with issues of prestige. Suber<sup>3</sup> argues that prestige is based on reputed excellence, while quality is actual excellence. Quality and prestige positively influence each other, but prestige is time dependent—it does not occur immediately.<sup>3</sup> Like the ATEJ, many open access journals are relatively new and, as such, prestige is likely not yet established. To that end, authors and readers must recognize that the perceived quality of an open access journal is a byproduct of the journal staff (eg, editors, editorial board) and reviewers, and is no different from traditional, print journals with similar human and financial resources. With time and continued submission of quality scholarly products, prestige and quality will grow.

## Question #1: Will readers find and cite my work that I publish in an open access journal?

Authors more familiar with traditional print journals may believe that open access journals are not mainstream and, thus, their work may not be as readily found by other scholars. In a recent study published in the BMJ, a key finding was that open access journals were more heavily accessed and downloaded, but the number of citations (the number of times the articles were referenced)

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from open access journals was not higher than non open access journals.<sup>7</sup> A study by Calver and Bradly also found that open access journal articles did not receive significantly higher citation rates compared to non-open access journals.<sup>8</sup> These findings, however, contrast a study that found higher citation rates for open access journals across four disciplines.<sup>9</sup> Based on this limited information, one's work published in an open access journal will certainly be found and accessed, but whether it is frequently cited may depend on many other factors.

### **Question #2: Do I have to pay for publishing in an open access journal?**

One primary advantage of open access journals is making articles available to a multitude of readers at no cost.<sup>10</sup> Many open access journals, however, are financed by imposing a fee for authors who publish.<sup>1,4</sup> The answer to question #2, then, is dependent upon the journal selected as a potential publication outlet and their financial structure. The ATEJ does not use an "author pay" model.

Some research findings have indicated that an author charge for publication may inhibit submissions.<sup>4</sup> Moreover, many authors hold negative perceptions related to the "author pay" models used by some open access journals.<sup>4</sup>

### **Closing Thoughts**

Creating and transmitting new knowledge in professional publication outlets is a critical and noteworthy responsibility we have as scholars. I am both pleased and impressed with the National Athletic Trainers' Association for taking advantage of the open access movement and building a journal that is open and available to all.

Some misconceptions about open access journals still exist. Through dialogue we can lay bare common myths and provide answers to frequently asked questions that pertain to open access journals. As consumers of the ATEJ, I encourage all of us to educate our peers about the nature and principles of open access journals.

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# The Relationship Between Student Evaluation of Instruction Scores and Faculty Formal Educational Coursework

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**Context:** Emphasis is placed on athletic training educators' content area expertise and not on their formal training in educational concepts.

**Objective:** The purposes of this study were to identify the amount of educational coursework completed by ATEP faculty and investigate the relationship between ATEP instructors' student evaluation of instruction scores and their formal educational coursework completed.

**Design:** Survey design that included demographic and questionnaire components.

**Setting:** Self-administered questionnaires

**Participants:** The population for the study was athletic trainers working as full-time faculty in Florida ATEPs ( $n = 19$ ; mean age  $39.2 \pm 8.03$ ; mean teaching experience  $8.84 \pm 5.79$  years).

**Data Collection:** Faculty participants completed a demographic questionnaire. Students in a non-laboratory based and non-clinical education course taught by the faculty member completed the Students' Evaluation of Educational Quality questionnaire.

**Analysis:** Correlations and independent samples t-tests were analyzed.

**Results:** Faculty completed  $9.25 \pm 7.39$  education courses. The study found positive correlations of moderate/large effect sizes between 7 of the 9 Student Evaluation of Educational Quality (SEEQ) subscales as well as the total SEEQ score, and the number of education courses taken by faculty. The positive correlation between the "Assignments/Readings" subscale and the number of education courses taken by faculty was significant. Independent samples t-tests demonstrated that when faculty had taken more than 10 courses related to education, their students rated them significantly higher on the "Learning/Academic Value" and "Assignments/Readings" subscales than faculty who have taken 10 or fewer courses.

**Conclusion(s):** There is a lack of uniformity among ATEP faculty regarding the quantity of formal educational coursework. The results of this study provide some evidence that a positive relationship exists between educational coursework and some student evaluation of instruction subscale scores.

**Key Words:** Students' Evaluation of Educational Quality (SEEQ), student perception of instruction, qualifications of athletic training faculty

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# The Relationship Between Student Evaluation of Instruction Scores and Faculty Formal Educational Coursework

Kristen Schellhase, EdD, ATC, CSCS

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The profession of “athletic training educator” began in the late 1960s following the first National Athletic Trainers’ Association (NATA) proposed curriculum model in 1959.<sup>1</sup> Until that time, athletic trainers were educated using the coursework and faculty of other disciplines.<sup>1,2</sup> In 1969, there were four athletic training educational programs (ATEPs). These programs still relied, in part, on faculty within other disciplines like physical education and physical therapy. However, they were the first to offer the specific and planned curricular route approved by the NATA.<sup>1</sup> That first approved curriculum evolved in tandem with the profession as a whole, and now clearly stands as a distinct curriculum with faculty who are more discipline-specific than in the past. As of 2010, the number of ATEPs in the United States had grown to 348 professional undergraduate programs and 23 professional master’s programs.<sup>3</sup>

Athletic training education has recently emerged from a period of significant reform.<sup>4</sup> In 2004, the elimination of the internship route for BOC exam eligibility established important structure and uniformity among ATEPs. Changes in accreditation standards have also brought oversight that was largely absent in many internship-based ATEPs a decade ago. Currently, ATEPs accredited by the Commission on Accreditation of Athletic Training Education (CAATE) follow standards related to sponsorship, personnel, financial resources, physical resources, operational policies and fair standards, health and safety, student records, outcomes, curriculum and instruction, and clinical education. However, of the 38 standards, none address a mandate for faculty to be formally trained or experienced with educational concepts. One standard, B1.34, addresses the qualifications of the program director, stating that the program director must “demonstrate teaching, scholarship and service consistent with institutional standards,” but falls short of a specific requirement.<sup>5</sup>

The lack of emphasis placed on collegiate faculty having formal training in the field of education is not unusual. In many fields, college faculty are expected to have content area expertise, not necessarily pedagogical expertise. In medical education, it was traditionally thought that a qualified practitioner ensured a qualified instructor or that a good teacher is “born” and not “made.”<sup>6,7</sup> In public high schools, the qualification to be a teacher is usually a teaching degree or the completion of a teacher certification program in addition to subject matter competence. In higher education, subject matter competence is primary. Applicants are hired according to their academic preparation in their field of study and not generally according to their formal preparation for the pedagogical responsibilities of the position. It is assumed that if the candidate knows the content, they will be able to teach, or that through experience in the classroom, the requisite teaching skills will develop. However, while introducing a new “Teaching and Learning” column in the Athletic Training Education Journal, Berry notes that content knowledge does not necessarily translate to the ability to deliver content to students in a meaningful way.<sup>8</sup>

While several researchers report that athletic training faculty lack formal coursework in the field of education, little research has been done to assess the specific quantity of coursework in education, teaching practices, or educational knowledge of athletic training faculty.<sup>9-11</sup> Athletic training research that specifically addresses classroom instructional methods is narrow and there is no known research on whether formal preparation in the area of education influences student outcomes. While there is some demographic data related to the degrees earned by athletic training educators, little is known about the amount of formal educational coursework taken by the cadre of athletic training educators because of differing participant groups and methodologies.<sup>9,10,12-14</sup>

Research in other disciplines suggests that formal education is linked to student outcomes such as student evaluation of instruction scores.<sup>15</sup> A very commonly used student feedback questionnaire in the United States is the Students' Evaluation of Educational Quality Questionnaire (SEEQ). The average student response score is found to have excellent reliability, reasonable validity and a robust factor structure.<sup>16,17</sup> Some research has been conducted examining the relationship between a faculty member's participation in a teacher education program and the SEEQ scores of their students. Gibbs and Coffey<sup>15</sup> investigated teachers in 20 universities in 10 countries and found that after a year of participation in a teacher education program, five SEEQ subscale scores increased while the SEEQ scores in the control group remained the same or decreased. The five subscales that correlated significantly were: “Enthusiasm,” “Organization,” “Group Interaction,” “Rapport,” and “Breadth.” In addition, the study reported that students scored the trained teachers statistically significantly higher in the area of “Student Learning.”<sup>15</sup>

Teaching effectiveness is a complex construct. There are multiple ways that teaching effectiveness is measured. Student-centered outcomes such as pass rates on board examinations, skill examinations, and student evaluation of instruction scores can be used. In addition, teacher-centered outcomes, such as self-reported behaviors, observed classroom behaviors, peer/supervisor evaluations, and student evaluations are also used. This study examined only one of these measures, student evaluation of instruction scores, because they are widely used in higher education. Though some faculty believe there is a substantial deal of bias in these scores, Aleamoni reviewed student perception of instruction research and determined that students' judgments are consistent, students are not fooled by their attraction to the teacher, and that there is little influence from factors such as class size, student gender, instructor gender, time of day, major of the student, semester, or expected grade.<sup>18</sup> Marsh found that SEEQ scores had excellent reliability and reasonable validity.<sup>19</sup> Currently, there are no known studies related to athletic training education and student perception of instruction scores. Given that student perception of instruction scores are widely used in higher education for evaluation, promotion and tenure, it is important to investigate the factors that influence these scores.

There were two main purposes for this study. First, the study attempted to gain a greater understanding of the amount of formal educational coursework taken by athletic training educators. Second, the study attempted to examine whether the amount of formal faculty coursework in educational concepts was related to student evaluation of instruction scores as measured by the SEEQ. While it is recognized that some athletic training educators have backgrounds in other disciplines, the study excluded participants who were not athletic trainers to gain a better understanding of the backgrounds of those who have come from, and remained in, the discipline.

## METHODS

### Questionnaire Population and Responses

Faculty participants were identified using the CAATE online database of Florida's accredited athletic training education programs.<sup>20</sup> Faculty participants from 10 of the 13 CAATE accredited ATEPs in Florida were recruited. IRB constraints prevented recruitment from two ATEPs, and the researcher's home ATEP was also excluded. Participation was sought from every full-time (defined as teaching two or more courses each semester) faculty member at each of the participating Florida ATEPs who also held the certified athletic trainer (ATC) credential. Therefore, 21 faculty in ten ATEPs were solicited.

The demographic questionnaire was distributed by mail to the 21 faculty and reminders were sent by mail and email using Dillman's five-contact method.<sup>21</sup> One questionnaire was completed by a person who was not an athletic trainer and that data were not calculated in the results. One questionnaire was not returned. Therefore, the study obtained a response rate of 95% (19 of 20) for the initial questionnaire. Including the faculty at schools that were unable to participate, the study was able to gain demographic data from 66% (19 of 29) of all faculty teaching full-time in a Florida ATEP. The faculty were also asked to identify a course that did not have a separate laboratory component and was not a clinical education course and its enrollment for use in the second part of the study. This delimitation was used to ensure greater uniformity of courses among the responding faculty participants.

At the end of the semester, faculty were asked to have the students in their selected course complete the Students' Evaluation of Educational Quality (SEEQ) (Marsh, © 2002). SEEQs were completed by the students of 84% (16 of 19) of the faculty who participated in the demographic portion of the study. Therefore, the study was able to obtain SEEQ data from the students of 55% (16 of 29) of all full-time faculty athletic trainers teaching at ATEPs in Florida. All but two respondents reported full participation from every student in attendance. Class sizes ranged from 5 to 27 students per class, with a total of 202 students completing the SEEQ questionnaire. The mean number of SEEQs completed by students per faculty member was 12.56.

### Instruments and Procedures

The study received Institutional Review Board (IRB) approval. Faculty completed a demographic questionnaire related to

clinical and teaching experience, employment characteristics, and educational history. Clinical and teaching experience was measured with the following variables: years of experience teaching at least two courses per semester in an ATEP, and years of experience working directly with patient/athlete care. Employment characteristics were measured with the following variables: college in which the ATEP is housed; description of current position (tenured, tenure-track, non-tenure track); annual evaluation/promotion and tenure emphasis on teaching, research/scholarship, and service; and number of hours spent on certain tasks related to the faculty member's position. Educational history was measured with the following variables: type of undergraduate, master's, and doctoral degrees (classification, major, specialization, number of education courses); and completion of a K-12 certification program. Faculty were also asked to report their age, gender, and ethnicity, as well as the enrollment in the context course.

Permission to use the Students' Evaluation of Educational Quality (SEEQ) (Marsh, © 2002) was obtained from its creator, Herbert Marsh. The instrument contains nine factors, assessed by 32 questions. Responses are based on a Likert scale with values ranging from 1-9 (1 = "strongly disagree" to 9 = "strongly agree"). Table 1 provides a list of factors and an example question from each. The average student response score is found to have excellent reliability and reasonable validity.<sup>16,17</sup> The estimated reliability of the class average response from the SEEQ factors is high. Marsh states that the estimated reliability is .95 for 50 students, .90 for 25 students, and .74 for ten students.<sup>19</sup>

**Table 1.** Example Questions from SEEQ

Subscale	Example Question
Learning/Academic Value	You found the course to be intellectually challenging and stimulating.
Enthusiasm	Staff member's style of presentation held your interest in class.
Organization/Clarity	Class materials were well prepared and carefully explained.
Group Interaction	Students were encouraged to participate in class discussions.
Individual Rapport	Staff member made students feel welcome in seeking help/advice in or outside of class.
Breadth of Coverage	Staff member presented points of view other than his/her own when appropriate.
Examination/Grading	Feedback on assessments/graded material was valuable.
Assignments/Readings	Readings, assignments, etc. contributed to appreciation and understanding of the unit.
Overall Rating	Overall, how does this staff member compare with other staff members at this institution? (1 = very poor, 9 = very good)

## Data Analysis

Data gained from faculty demographic questionnaires and completed SEEQs were obtained and analyzed using SPSS for Windows (SPSS Inc. Chicago, Illinois), a statistical software package. Data regarding means, standard deviations, ranges, and normality variables (skewness, kurtosis) were reported for interval data while frequencies and percentages were reported for nominal data. Correlations between the number of formal educational courses taken by ATEP faculty and the class mean of the total score and subscale scores on the SEEQ were analyzed. Finally, independent t-tests were conducted to identify mean differences in SEEQ total scores and subscale scores based on faculty who had taken 10 or fewer education courses as compared to more than 10 courses.

## RESULTS

### Relevant Demographic Data

#### *Personal and Employment Characteristics*

The respondents for this study were  $39.2 \pm 8.03$  years old ( $n = 19$ ), had  $8.84 \pm 5.79$  years of teaching experience and had  $11.5 \pm 7.06$  years of experience with patient care. The group was represented by 57.9% ( $n = 11$ ) females and 42.1% ( $n = 8$ ) males. A majority (89.5%;  $n = 17$ ) of respondents reported their race/ethnicity as "White." The remaining respondents (10.6%;  $n = 2$ ) selected a minority classification. While most (78.9%;  $n = 15$ ) respondents were non-tenure track at their institutions, three (15.8%) were currently classified as tenure-track, and 1 respondent was tenured (5.3%). With regard to annual evaluation, promotion and tenure, 94.1% of faculty ( $n = 17$ ) reported that teaching was emphasized to a "great extent." Research/Scholarship and Service were emphasized to a "great extent" in 41.2% and 29.4% of faculty decisions on annual evaluation, promotion and tenure, respectively ( $n = 17$ ).

#### *Educational Characteristics*

The majority of full-time athletic trainers teaching in a Florida ATEP described having a Bachelor of Science (BS) degree (89.5%;  $n = 17$ ). One (5.3%) reported earning a Bachelor of Arts (BA) degree and one degree is unknown (5.3%). Regarding major classification, three respondents reported holding dual majors in "Physical Education" and "Sports Medicine/Athletic Training." In those cases, both majors selected were counted. Six of the respondents (31.6%) reported an undergraduate degree in "Physical Education" and none reported a degree in "Education." 47.4% ( $n = 9$ ) reported that their undergraduate degree contained a minor or specialization in education. The undergraduate major classifications related to education are summarized in Table 2.

Respondents were also asked to classify their master's degree as "MA," "MEd," "MS" or "other." The majority of respondents (78.9%;  $n = 15$ ) reported earning MS degrees, with the remaining four respondents evenly divided between MA (10.5%;  $n = 2$ ) and MEd degrees (10.5%;  $n = 2$ ). Master's degree majors varied among

**Table 2.** Comparison of Faculty Respondents' Degree Majors

	Current Study		Rich	
	<i>n</i>	(%)*	<i>n</i>	(%)**
<b>Undergraduate</b>				
Physical Education	6	(31.6)	63	(33)
Education	-	-	3	(1.5)
Secondary Education	-	-	2	(1)
Elementary Education	-	-	1	(0.5)
<b>Graduate</b>				
Physical Education	3	(15.8)	27	(15)
Education	1	(5.3)	22	(12)
Health Education	1	(5.3)		
<b>Doctoral (completed or in progress)</b>				
Curriculum & Instruction	4	(26.7)	15	(9)
Higher Educ. Admin.	3	(20.0)	10	(6)
Higher Education	1	(6.7)	13	(8)
Higher Educ. Leadership	-	-	10	(6)
Other Education Area	-	-	14	(8)

\*  $n = 19$  for respondents who earned undergraduate and graduate degrees,  $n = 15$  for respondents who earned or are in progress with doctoral degrees. Percentages were calculated as respondents chosen degree divided by  $n$ .

\*\* Rich calculated the ratio of each degree classification in relation to the total number of majors chosen even if respondents chose more than one degree classification.

eight types. Three respondents selected two classifications of majors. In those cases, both majors selected were counted. However, only 26.3% ( $n = 5$ ) of respondents claimed to have earned degrees related to education. Table 2 shows the quantity and percentages of master's degrees related to education.

Furthermore, respondents were asked to classify their doctoral degree as "DPT," "EdD," "PhD," "other," "I am currently in process of earning a doctoral degree," or "I have not completed a doctoral degree." Those in progress for a doctoral degree were asked to specify the type of degree they expected to earn. All but four (78.9%;  $n = 15$ ) of the respondents had either completed or were in the process of earning a terminal degree. Six respondents classified their earned degree as a PhD (31.6%), two classified their earned degree as an EdD (10.5%), and the remaining seven (36.8%) of respondents were currently in progress with a doctoral degree. Including the earned and in progress doctoral degrees ( $n = 15$ ), 60% ( $n = 9$ ) of respondents reported a PhD, 26.7% ( $n = 4$ ) of respondents reported an EdD, and 6.7% ( $n = 1$ ) of respondents reported a DHSc. One respondent supplied their major designation instead of their degree designation, and therefore, their degree designation is unknown (6.7%).

Doctoral degrees were varied. The four respondents who stated that they have not earned and are not in progress with a doctoral degree were excluded from this question. One respondent supplied two answers to the question. Both degrees were related to

education as the respondent reported a dual degree in "Curriculum and Instruction" and "Higher Education Administration." Including only those respondents who have earned or are in progress with earning a doctoral degree, seven (46.7%) doctoral degrees were related to education. If all respondents are included (n=19), 36.8% of ATEP faculty included in the study have earned, or are in progress of earning a doctoral degree related to education. Table 2 illustrates the doctoral degrees related to education.

The summed total of education courses from each degree level was determined and treated as ratio data. Due to some inconsistencies in the open-ended responses given by the participants, the most conservative value given to determine the number of courses in each of the degree levels (eg "10+ courses was treated as 10 and "2 or 3 courses" was treated as 2). In addition, due to missing data or inappropriate responses, two respondents' data were eliminated. The mean from all other respondents was  $11.06 \pm 10.33$  courses (n = 17). The range was 40 courses with a minimum number of 0 courses reported and a maximum of 40 courses reported. The data was slightly positively skewed and slightly leptokurtic (skewness = 1.466, SE = .550; kurtosis = 2.687, SE = 1.063). A Shapiro-Wilk calculation indicated non-normality (p = .025). One respondent reported taking 40 educational courses. When this outlier was removed, the data became normal with a mean of  $9.25 \pm 7.39$  courses (n = 16); skewness = .595, SE = .564; kurtosis = -.379, SE = 1.091; Shapiro Wilk = .938, p = .328) and a range of 25 courses (0 to 25 courses).

### Students' Evaluation of Educational Quality Reliability and Validity

Cronbach's alpha was calculated for each of the SEEQ subscales. Two hundred and two students completed the SEEQ questionnaire. One student's questionnaire was omitted from the analysis because it appeared to be completed incorrectly, with all values given as "strongly disagree" or "disagree" despite very positive and exclusively complimentary comments on the free response section. Therefore, the analysis reflected 201 students' SEEQ questionnaire data. The total SEEQ scores and all subscale scores were judged to be very reliable for the students to whom the SEEQ was given. Item numbers and Cronbach's alpha values are presented in Table 3.

Evidence of construct validity was sought using exploratory factor analysis of the SEEQs returned in the study. A Promax rotation was selected because there were large correlations among the questions. Interpreting the underlying constructs behind the five factors was not possible because many items were loaded under multiple factors and each factor had many differing items loading under it. These results raise questions about the internal structure validity of the current version of the SEEQ (nine factors) as used with the population in the current study. However, Coffey and Gibbs performed confirmatory factor analysis on an earlier version (6 factors) of the SEEQ using Principal Components with Varimax rotation.<sup>16</sup> That analysis found the appropriate 6 factors and confirmed several earlier analyses by Marsh.<sup>19,22</sup> The SEEQ is widely accepted as a reliable and valid instrument. However, given the SEEQ subscale construct validity concern in this study,

**Table 3.** Reliability Estimates for the SEEQ

	Item Numbers	Cronbach's Alpha
Learning/Academic Value	1, 2, 3, 4	.867
Staff Member Enthusiasm	5, 6, 7, 8	.914
Organization/Clarity	9, 10, 11, 12	.867
Group Interaction	13, 14, 15, 16	.875
Individual Rapport	17, 18, 19, 20	.908
Breadth of Coverage	21, 22, 23, 24	.854
Examination/Grading	25, 26, 27	.928
Assignments/Readings	28, 29	.894
Overall Rating	30, 31	.905
<b>Total SEEQ Score</b>	<b>All Items</b>	<b>.971</b>

the results of the subscale analysis should be interpreted with caution.

### Significant Findings

The study found one statistically significant two-tailed correlation ( $r = .654$ ,  $P < .05$ ) between the amount of formal educational coursework and the SEEQ subscale value of "Assignments/Readings." This positive correlation is considered to be a large correlation with a large effect size.<sup>23</sup> This means that instructors who have completed more educational courses tend to have higher scores on the "Assignments/Readings" subscale. Other correlations between the amount of formal educational coursework and SEEQ subscales were not statistically significant, nor was the correlation between the amount of formal educational coursework and the SEEQ total score. However, due to a small sample size, the power of the statistical analysis is low. Despite the low statistical power, The Learning/Academic Value" and "Breadth of Coverage" subscales had correlation coefficients of .484 and .494 respectively. These positive correlations are considered to be large correlations with large effect sizes according to Cohen.<sup>23</sup> This means that instructors who have more educational courses tend to have higher scores on the "Learning/Academic Value" subscale and the "Breadth of Coverage" subscale. In addition, the SEEQ total score and four subscales demonstrated medium correlations and medium effect sizes according to Cohen.<sup>23</sup> This means that instructors who have more educational courses tend to have higher scores on the "Staff Member Enthusiasm," "Organization/Clarity," "Group Interaction," and "Examination/Grading" subscales. Also, instructors who have more educational courses also have higher scores on the entire SEEQ. Given that all statistically significant and non-significant correlation values were in the positive direction, it is possible that a study with more statistical power would find greater significance. Table 4 shows the correlation values, and effect sizes.

To examine mean differences in SEEQ total scores and subscale scores based on faculty who had taken 10 or fewer education courses as compared to more than 10 courses, independent *t* tests were conducted. The dependent variable, number of

**Table 4.** SEEQ Correlations with Educational Coursework Completed

	<i>r</i>	Effect Size Interpretation
Learning/Academic Value	.484	Large
Staff Member Enthusiasm	.365	Medium
Organization/Clarity	.297	Medium
Group Interaction	.362	Medium
Individual Rapport	.084	N/A
Breadth of Coverage	.494	Large
Examination/Grading	.265	Medium
Assignments/Readings	.654 **	Large
Overall Rating	.239	Small
Total SEEQ Score	.382	Medium

\*\* Indicates significance at the .05 level (2-tailed)

educational courses, was split into two groups. The first group contained participants with “10 or less courses” and the second group contained participants with “more than 10 courses.” The independent variable was the class mean on all items of the SEEQ. Fourteen participants submitted both acceptable education course demographic data and SEEQ data. Assumptions of normality and equality of variances were tested and met. The respondents who took 10 or fewer courses had a mean SEEQ total score of  $220 \pm 25.09$  ( $n = 7$ ) while the respondents who took more than 10 courses had a mean SEEQ total score of  $244.59 \pm 20.25$  ( $n = 7$ ). Results show that there is not a statistically significant difference between the means of the two groups ( $P = .067$ ,  $t = -2.017$ ,  $df = 12$ ; Cohen’s  $d = -1.165$ ).

Independent samples *t*-tests were also conducted to evaluate the relationship between the two educational course groups, and the scores on the SEEQ subscales. Assumptions of normality and equality of variances were tested and met. Results show that there is a statistically significant difference for the class mean scores of “Learning/Academic Value” ( $P = .012$ ,  $t = -2.945$ ,  $df = 12$ ; Cohen’s  $d = -1.700$ ) and “Assignments/Readings” ( $P = .006$ ,  $t = -3.290$ ,  $df = 12$ ; Cohen’s  $d = -1.9$ ) subscales. In both cases, the mean scores for faculty who had taken more than 10 education courses were higher than faculty who had taken 10 or fewer education courses. Both had at least a medium effect size as interpreted by Cohen.<sup>23</sup> A summary of the results is found in Table 5.

## DISCUSSION

### Formal Educational Coursework

The first part of the study attempted to identify the amount of formal educational coursework taken by athletic training educators. While the study was limited to ATEP faculty in Florida, the data from this study can be compared to other recent studies to determine whether the research population in the current study differed significantly from the larger population. The ages

and experience levels of respondents were similar to other researchers and can therefore allow some comparisons between study populations in the area of educational history.<sup>10,12,14</sup>

The literature includes three studies that were relevant to this topic. Mench & Ennis performed a qualitative study using instructors teaching in a limited number of ATEPs.<sup>12</sup> Hertel et al performed a study that included only doctoral-trained faculty and attempted to ascertain the characteristics of that limited population.<sup>10</sup> Rich performed a study that examined the educational backgrounds of athletic training educators. That study was quantitative in nature, recruited subjects teaching in ATEPs, and was not exclusive to doctoral-trained faculty. For these reasons, Rich’s study is the most relevant and similar to the current study.<sup>14</sup>

Rich calculated the degree demographics in a slightly different manner than the current study, and reported the percentages as a ratio of each type of degree to the total number of degrees. Rich did not calculate the total number of respondents who reported any certain degree designation. At the undergraduate level, Rich evaluated 174 respondents who earned 189 bachelor’s degrees and found that the degrees related to education were 35% of the total degrees earned.<sup>14</sup> The current study found that 31.6% of respondents earned a degree related to education. Using the same methodology, Rich study reported 27% of the total master’s degrees were related to education. The current study found that 26.4% of respondents earned a master’s degree related to education. While 63% of the respondents in Rich’s study had earned or were in progress with a doctoral degree, 78.9% of respondents in the present study met those criteria. The percentage of doctoral degrees related to education in Rich’s study was 37%, whereas the present study reflected 46.7% of doctoral degrees related to education.<sup>14</sup> The results for the two studies were very similar for undergraduate and graduate degrees, but demonstrate a possible increase in the number of faculty with doctoral degrees (completed or in progress) as well as a possible increase in the number of doctoral degrees that are related to education. Specifically, an increase in the number of ATEP faculty who have earned doctoral degrees would likely translate to a greater ATEP faculty presence, legitimacy and participation in the academy. Greater percentages of doctoral degrees related to education may be seen as a benefit to the profession by some due to the increased training in pedagogy and curriculum provided by those programs. However, if fewer ATEP faculty are earning doctoral degrees in more scientific content areas (eg, exercise physiology, rehabilitation sciences, biomechanics), this may translate to decreased research productivity in evidence based practice areas desired by the profession.

The two studies found similar results for the mean number of education courses taken by respondents. The current study found the mean to be 8.13 courses and the Rich study found the mean was 9.25 courses. Both studies reported large standard deviations. The standard deviation for the current study was 7.39 (0 to 25 courses) and the standard deviation for the Rich study was 11.06 (0 to 70 courses).

Given the data reported by the participants of both studies, there is considerable lack of uniformity among faculty in the

**Table 5.** SEEQ and Subscales t-tests

	<b>t</b>	<b>df</b>	<b>sig</b>	<b>Cohen's d</b>	<b>Effect Size Interpretation</b>
Learning/Academic Value	-2.945	12	.012 **	-1.700	Medium
Staff Member Enthusiasm	-2.046	12	.063	-1.181	Medium
Organization/Clarity	-1.649	12	.125	-.952	Small to Medium
Group Interaction	-1.937	12	.077	-1.118	Medium
Individual Rapport	-.501	9.347 *	.628	-.328	Small
Breadth of Coverage	-2.079	12	.060	-1.200	Medium
Examination/Grading	-1.651	12	.125	-.953	Small to Medium
Assignments/Readings	-3.290	12	.006 **	-1.9	Medium to Large
Overall Rating	-1.132	12	.280	-.654	Small
Total SEEQ Score	-2.017	12	.067	-1.165	Medium

\*\* Indicates statistically significant values

\* Indicates unequal variances assumed

area of formal training in educational concepts. Both studies demonstrate that students in ATEPs can be taught by someone who has taken no formal coursework in education, or they could be taught by someone who has one or more education degrees that include a plethora of courses in pedagogy and curriculum.<sup>14</sup> The Commission on Accreditation of Athletic Training Education currently does not mandate that faculty have any formal training in education, nor does it mandate any particular degree qualification.<sup>5</sup> Given the lack of mandates, standards, or expectations in the area of formal training in education, it is not surprising that there is a wide range of formal preparation represented. However, the large differences in formal preparation may influence educational outcomes so it is important that research investigate whether these differences matter.

### Student Evaluation of Instruction Scores

The second part of the study examined the relationship between the amount of formal coursework in the area of education and student evaluation of instruction scores as measured by the SEEQ. The current study found that faculty with more formal educational coursework were rated statistically significantly higher on the SEEQ subscale value of "Assignments/Readings." This subscale is a new addition to the SEEQ and was not evaluated in the Gibbs and Coffey study.<sup>15</sup> In addition, the current study found that, although statistically insignificant, positive relationships existed between all subscales. Each subscale correlation, other than "Individual Rapport" and "Overall Rating," had a medium or large effect size. Finally, the current study found that those faculty who had more than 10 education courses had statistically significantly higher scores on the "Assignments/Readings" and "Learning/Academic Value" subscales. While the "Assignments/Readings" subscale is a new addition, the results from this study agree with Gibbs and Coffey that participation in a teacher education program does correlate positively with student learning.<sup>15</sup> The large differences in the formal preparation of ATEP faculty, along with the research showing that this formal preparation influences

student perception of instruction total scores and subscale scores, suggests that formal training in educational concepts should be added to the list of criterion used when hiring ATEP faculty.

### Implications for Annual Evaluations, Promotion and Tenure

There is very little prior research on ATEP faculty student evaluation of instruction scores. The limited research relating to student evaluations finds that ratings of "good to excellent" are expected and that evaluation of classroom instruction is important.<sup>13</sup> For example, 80% of Staurowsky and Scriber's respondents said that student evaluation of instruction scores are important or very important to promotion and retention.<sup>14</sup> Similarly, the current study found that 91.4% of respondents said that their teaching was emphasized to a "great extent" when it came to annual evaluation, promotion, and tenure.

If student evaluation of instruction scores are used heavily for annual evaluation, promotion, and tenure decisions, this study demonstrates that the reliability of these scores is concerning. Marsh found that SEEQ factor reliability estimates decline significantly as enrollment decreases. Marsh estimates that the reliability coefficient for 50 students is 0.95; 25 students is 0.9; ten students is 0.74; five students is 0.6; and one student is 0.23.<sup>17</sup> Six respondents in this study reported class enrollments that were fewer than 10 students.

According to the above estimates by Marsh, about a third of the faculty respondents in this study will have student evaluation instrument reliability that is questionable.<sup>17</sup> For this reason, the statistical analysis of this study should be interpreted with caution. Furthermore, this information is very important since 94.1% of these same respondents reported that the emphasis on teaching for annual evaluation, promotion, and tenure was to a "great extent." In addition, Marsh points out that there is significant variety in the instruments to evaluate educational quality.<sup>17</sup> Not all methods used are multi-dimensional, reliable, and/or valid. If

the enrollment in courses is low, and the instrument used is not confirmed to be statistically valid, faculty are being evaluated using data that is not indicative of their actual teaching ability. Without quality feedback, it is difficult for department chairs and deans to fairly evaluate the teaching ability of the ATEP faculty. This represents an important issue for the success of athletic training students as well as the success of ATEP faculty in academia. Faculty need to be aware of the statistical limitations of the scores they receive and advocate for a multifaceted approach to performance evaluation.

Marsh argues that teaching effectiveness, as measured by student evaluations, is highly stable over time.<sup>25</sup> For teachers to improve their teaching, feedback as well as intervention is necessary. For the faculty in this study with low enrollment, the reliability of the feedback they receive from students is questionable. Therefore, improvements in teaching ability will be hampered by the inability to receive quality information about their performance.

### Limitations

The limitations of this study are largely based on the low statistical power created by a small population sample. The study had an excellent response rate (95%; 19 of 20) for the demographics questionnaire, and gained participation from 10 of the 13 ATEPs in Florida. The study had a good response rate (84%; 16 of 19) for the SEEQ. However, due to the fact that three ATEPs were unable to be invited to participate, and three incidences of attrition, the study was only able to gain total participation from 55% (16 of 29) of all the faculty teaching in Florida. Due to the inability to obtain enough statistical power, the results and discussion concentrate on effect sizes rather than statistical significance.

In addition, the study found that many faculty respondents had course enrollments that raise concerns about the reliability of the SEEQ data. While an important limitation for the statistical analysis of this study, this finding has much wider implications for faculty who seek to use the information gained by student evaluation of instruction scores to improve their teaching. It also raises serious concerns about the use of this kind of data for annual evaluation, promotion and tenure.

### Recommendations for Further Research

There are several areas that should be explored as a result of this study. First, given the trend in the data, the study should be replicated using a larger sample size. An additional study with more statistical power could provide important information regarding the educational background of ATEP faculty outside of the Florida. Second, it is worthwhile to investigate the student evaluation of instruction instruments that are used for feedback on teaching effectiveness as well as the influence these instruments have on decisions related to annual evaluations, promotion, and tenure. Third, given the complex construct of effective teaching, research investigating other markers of good teaching is needed as well as an investigation of the other, less formal, ways faculty may choose to improve teaching. Fourth, this study found that nearly 79% of full-time ATEP educators in Florida are in non-

tenure track positions, despite 50% having an earned doctorate. If this is true across the country, research is needed regarding the availability of tenure-earning positions for appropriately credentialed athletic training educators.

### CONCLUSIONS

The results of this study provide some evidence that there is a positive relationship between educational coursework and student evaluation of instruction scores. Students reported that the learning and academic value provided by the instructor was higher when the instructor had more educational coursework in their background. Students also reported that instructors with more educational coursework were better in the area of assignments and readings. While the results of this study should be interpreted with caution, trends in the data suggest that further investigations could result in findings that would be very useful to ATEP faculty and the administration at the institutions that house ATEPs. If further investigations also show that more educational coursework increases the students' evaluations of educational quality, recommendations could be made regarding the professional preparation of ATEP faculty in the future.

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# Underpinnings of Competency-Based Education

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**Context:** To understand and appropriately implement competency-based education (CBE) to its fullest potential in professional programs, an investigation of its evolution is required.

**Objective:** To reveal the development of the CBE approach now dominating many professional programs in higher education, including Athletic Training Education Programs (ATEPs). While behavioral science research at the turn of the 20th century laid the groundwork for the CBE approach, the process used to establish its construct in education stemmed from scientific management methodology used in industry. A history of various educational paradigms, including social efficiency, essentialism, and vocationalism, contributed to the birth and eventual use of the CBE approach in professional programs.

**Data Sources:** Literature reviewed for this article included published articles and books pertaining to CBE and the sciences, philosophies, theories, and educational paradigms that constitute the underpinnings of the CBE approach used in higher education professional programs.

**Data Synthesis:** A contradiction of learning theories has led to inconsistent employment of the CBE framework, making its use inconsistent in professional programs. The emphasis in health care education programs, such as athletic training, has been on using specific behavioral objectives that provide distinct quantifiable data as competencies assessed within specific time frames, as opposed to incorporating integrated objectives as competencies with completion determined by level of skill achievement.

**Conclusions:** Authenticity and immeasurable skills are examples of limitations with the CBE approach in athletic training programs. These limitations will be discussed and suggestions for future direction provided.

**Keywords:** Competency-based education, reductionism, social efficiency, essentialism, vocationalism

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# Underpinnings of Competency-Based Education

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**A**s a result of various external forces, including the need for accountability, an educational paradigm shift toward competency-based education (CBE) is currently dominating professional health care programs in higher education. The purpose of the CBE approach is to create an educational experience that will prepare students for specific occupations by constructing an educational process based on attaining specific competencies, determining appropriate learning and assessment strategies, and creating achievement standards. While the traditional educational approach is process-oriented or driven by the subject matter, the CBE model used in health care programs is outcome-based or product-driven, and has a framework which commonly separates whole life-roles into specific behavioral objectives that are assessed and measured against pre-determined standards. CBE is defined by Spady<sup>1(p10)</sup> as, “a data-based, adaptive, performance-oriented set of integrated processes that facilitate, measure, record, and certify within the context of flexible time parameters the demonstration of known, explicitly stated, and agreed upon learning outcomes that reflect successful functioning in life-roles.” The emphasis of a CBE program is placed on outcomes and competency achievement without specifying a length of time.

In order to appreciate what a CBE model truly represents and strives to accomplish in health care professional education programs, it is essential to investigate phenomena that occurred in the late 19th to early 20th century which compelled its model, framework, purpose, and process development. Included in this review are the scientific, theoretical, and educational movement underpinnings of CBE methodology. The purpose of this work was to explore the historical development contributing to the CBE approach currently emphasized in higher education professional programs, specifically athletic training education programs.

## SCIENTIFIC UNDERPINNINGS

Edward L. Thorndike conducted behavioral studies in the early 20th century to gain an understanding of the learning process, and discovered that the mind was incapable of retaining large capacities of information. His finding was contrary to the mental-disciplinarian concepts of the time,<sup>2</sup> which alleged specific subjects of study had power to strengthen memory, reasoning, and imagination.<sup>2</sup> Instead, Thorndike advocated a stimulus-response theory that argued learning would occur if responses were reinforced by rewards, thus demonstrating that human behavior was controllable.<sup>3</sup> This stimulus-response theory may have established the roots for the use of a CBE framework in professional programs by demonstrating that, with appropriate stimulus and instruction, specific behavioral objectives can be learned.

Thorndike and his colleagues were among the first to use transfer tests to examine assumptions related to learning. The transfer of learning was described as the ability to extend what was learned in one context to new contexts.<sup>4</sup> The fundamental concept was

that the mind did not consist of simple mental operations such as memory and reasoning, but rather encompassed multitudinous elements representing separate and individual functions, including specific habits, facts, and skills.<sup>4</sup> He hypothesized that the degree of transfer between initial and later learning depended on the match between these elements across the two events.<sup>4</sup> Therefore, Thorndike’s transfer of learning theory meant that the brain had individual functions that were capable of learning specific knowledge or skills, but had difficulty transferring information between contexts. This science may lend strength to the CBE framework which advocates learning specific parts of a whole and individual behavioral objectives, and avoids crossing between contexts.

## THEORETICAL UNDERPINNINGS

Reductionism is a theory which states that a system can be fully understood in terms of its isolated parts.<sup>5</sup> This idea was first attributed to the ancient Greek philosopher, Democritus, who believed Leucippus’ atomic theory and argued that knowledge of specific atoms and their different properties would allow everything in nature to be explained.<sup>6</sup> An example of reductionism in medicine would be if a medical student could learn individual communication, decision-making, and manual skills separately, and then intuitively integrate them into a complete patient evaluation. Modern reductionist views are represented within the school of psychology as behaviorism.

Behaviorism is a philosophy that extols the need for observable, quantifiable aspects of behavior and excludes subjective phenomena.<sup>7</sup> The associated philosophies of objectivism and positivism provide further rationale for this doctrine. While objectivists believe knowledge is based on observed objects and events,<sup>8</sup> positivists develop knowledge directly from empiricism.<sup>8</sup> Together, objectivism and positivism support behaviorism’s ideals of observable and quantifiable data based on behavioral objectives and attributes (eg, knowledge, skills, attitudes, values). Spady<sup>1</sup> defines these capacities as the ability to compare objective data with pre-determined standards. Furthermore, the CBE framework in professional programs applies these theories by stipulating that students’ behaviors can be controlled through an instructional stimulus producing an anticipated, quantifiable response whose measurement was compared against predetermined standards.

The later stages of health care programs, such as in athletic training, often consist of advanced coursework and clinical rotations where competencies may take on life-roles or integrated capacities (ie, competencies<sup>1</sup>) that employ the theory of holism. One of the first proponents of holism was the ancient Greek philosopher Aristotle who believed wholes had an essence irreducible to their parts.<sup>9</sup> While the literature suggests that a competency is a specific knowledge, skill, behavior, or proficiency, the term does not have a universal definition. The holistic view is in direct opposition to reductionism.<sup>5</sup> The CBE framework used in health care programs in the United States initially relies on reductionism, but employs

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holism later in the program of study, such as during clinical rotations.

The theoretical basis for the CBE framework used in health care programs was derived from both philosophical inquiry and industrial innovation. In 1881, machine-shop supervisor, Frederick Taylor, sought to define a full and fair day's standard for each duty his workers performed.<sup>10</sup> He began by breaking each task down into its component parts and eliminating wasteful movements. He then measured the time each job required from initiation to completion. Using this information, Taylor was able to objectively establish a piece-rate or standard for each task. This method eliminated waste, reduced errors, and increased productivity in an era where mass production, effectiveness, and efficiency were paramount.<sup>7</sup> The use of the scientific method to empirically determine the most efficient ways to perform tasks and set performance standards formed the basis for scientific management theory.<sup>10</sup> Educational behaviorists eventually recognized that this industrial theory could be applied to classroom learning by dividing and sequencing course material.<sup>7</sup> Thus, scientific management theory may have established the groundwork for professional programs' CBE processes whereby activities such as conducting job analyses to discover the specific behaviors or capacities needed for a profession and carrying out the process systematically to create pre-determined standards were established.

## EDUCATIONAL MOVEMENTS

### Social Efficiency

Social efficiency, which was argued to have been developed by combining the idea of social control with the principles of scientific management to produce an efficient and effective educational system,<sup>2</sup> was one of several educational movements taking place in the early 20th century. Its curricular ideology was designed to prepare students for adult work and citizenship roles in an efficient, standardized way that would create an orderly and stable society.<sup>11</sup> The social control component of this movement stemmed from the work of sociologist Edward A. Ross. He referred to social control as an intentional dominant condition that stemmed from a self-conscious knowledge of factors and tendencies of social life and continued according to a plan.<sup>12</sup> Examples of this are beliefs, agencies, and regulations which prevent individual deviation from an expected norm and provided social order in a changing society.<sup>12</sup> Ross's work strongly influenced educational sociologists, including Snedden, Finney, Elwood, and Peters,<sup>2</sup> developed curricula tied to the roles future citizens were to perform<sup>2</sup> and used schools as instruments of social control to shape students. Although Ross's work was not directly concerned with education, it was a key element in the development of the social efficiency movement, enabling it to respond to the industrialization and urbanization of society. Tying education to future social roles is consistent with the goals of CBE.

Joseph Rice, a curriculum leader who advocated social efficiency ideology, voiced concern about the amount of irrelevant subject matter in present higher education curriculums, and argued

that the application of scientific management techniques, which were successful in industry, could eliminate unnecessary or repetitive material and free time to include other more socially important information. By removing superfluous material and streamlining the educational process, Rice believed a more directly related curriculum could be created to better serve the future adult roles students would occupy.<sup>2</sup> The social efficiency ideology sought to build an educational system that combined the principles of scientific management, such as standardization, with Ross's theory of social control to emphasize preparing students to positively contribute to an industrialized society in an efficient manner by eliminating unnecessary course work.<sup>2</sup> These characteristics helped formulate the rationale for introducing the CBE process in higher education.

### Essentialism

During the 1930s the educational theory of essentialism was introduced. As with social efficiency, it emphasized the need for programs in higher education to focus on the essential skills to become productive, effective citizens in society.<sup>13</sup> This theory proposed teaching skills systematically and sequentially, while insisting on high standards of achievement.<sup>13</sup> Essentialism fueled the standards movement, whose purpose was to improve education through academic standards to measure student achievement. In CBE programs, the objectives, or capacities, were generally measured against pre-determined standards to demonstrate competency of that particular skill or knowledge. An example of this is the use of standardized national exams to ensure competence of graduates in health care disciplines, including athletic training.

### Vocationalism

Vocationalism can trace its roots to before the social efficiency movement. In 1862, the Morrill Act formally recognized the role of higher education in preparing students for vocations by giving every state federal land to build at least one institution to teach subject matter related to agriculture and technical education to produce graduates with practical skills applicable in specific areas.<sup>14</sup> However, at the end of the 19th century, the majority of professional preparation took place on the job under apprenticeship arrangements.<sup>14</sup> This created a vocationalism gap in education before it would re-emerge in the early 20th century.

At the turn of the 20th century, social efficiency dominated American educational thinking. Early in the century, John F. Bobbitt, a scientific curriculum planner, developed a specialized field within social efficiency called occupational efficiency.<sup>11</sup> Expanding upon Rice's desire to eliminate seldom used material from the curriculum, he argued that curriculum should be constructed around predicted social and vocational roles. During the same time period, David Snedden espoused a similar vocational education curriculum built around adult roles and training students for social occupations.<sup>11</sup> He, however, recommended that curricula be built on "peths," or tiny units, organized around larger "strands," and based around adult life roles.<sup>2(p95)</sup> These concepts are found in modern CBE as behavioral objectives or capacities (peths) integrated into whole life-roles or

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competencies (strands).

Snedden himself led the charge to obtain federal funding for vocational education,<sup>14</sup> which was given a considerable legislative boost when President Wilson signed the Smith-Hughes act in 1917 to provide federal aid for vocational and job skill training in schools.<sup>14</sup> Vocational education fit perfectly into the social efficiency movement of the early 1900s, as it reinforced education as a preparation for a specific social and occupational role. Vocationalism continues to influence the educational system through its emphasis on career preparation for students.

No other educational movement in the 20th century had the same impact as vocationalism on American schools' curricula.<sup>14</sup> Although the vocationalism movement was not directly influential in the framework or methodology of the CBE approach, it is embodied in higher education professional programs whose purpose is to produce competent professional graduates in an efficient, standardized manner.

### **Competency-Based Education Movement**

The CBE movement originated from teacher education curricula in the United States during the 1970s, and quickly became an international phenomenon of competency assessment.<sup>15</sup> The concept of standardized basic competence can be traced back to medieval guilds where apprentices learned skills by working with a master. When the student reached the standards of workmanship associated with and set by the trade, they were awarded certain credentials.<sup>16</sup> This system of job preparation and use of standards is similar in process to the CBE approach, but a much greater connection between the two can be found in teacher preparation education programs.

The *Commonwealth Teacher-Training Study* was conducted in the United States by Charters and Waples beginning in 1925, and is the first published reference synonymous with CBE.<sup>17</sup> These authors argued that an analysis of teachers' activities and traits could be more useful for teacher training than information based on individual opinions.<sup>18</sup> By watching teachers in action and analyzing what characteristics made them excellent, Charters and Waples were able to form a master list of duties performed by teachers employed in multiple education settings.<sup>18</sup> The frequency, importance, difficulty of teacher learning, and desirability of learning these activities<sup>17</sup> were recorded, and then categorized into seven main divisions through a process called telescoping, which groups traits or activities that possess similarities.<sup>18</sup> The activities were also evaluated and the teachers' objectives defined and categorized into courses of instruction to be incorporated as outcomes in teacher education curriculum.<sup>18</sup> The goal of which was to introduce students as directly as possible to the specific duties they would perform when entering the teaching workforce.<sup>18</sup> The use of formal job analysis to identify traits or objectives first developed by the *Commonwealth Teacher-Training Study* simulated the process now employed by the CBE approach, whereby similar traits were categorized into groups and content areas or domains formed by comparable competencies or capacities in CBE.

Another concept similar to CBE, mastery learning, got its roots shortly after World War I.<sup>19</sup> During the war, the allies learned that a certain standard of performance had to be reached to vanquish the enemy.<sup>19</sup> Mastery learning requires students progress through a series of instructional frames, advancing to the next frame only when the content of the previous frame had been mastered.<sup>20</sup> This theory required that the learning environment be manipulated, as suggested by Thorndike's stimulus-response behavioral theory.<sup>20</sup> So that most or all students could attain mastery level, the subject matter would be broken into smaller units whose mastery was essential for attaining mastery of major objectives. The objectives were determined by formative assessment, while adequate time allowance was given students to accomplish mastery of the subject matter.<sup>20</sup> The mastery learning model is an educational approach that closely models the CBE framework.

According to Spady,<sup>1</sup> the CBE approach began in the United States in 1972 in teacher education. A true CBE approach was first introduced in medical education in 1990 when the Society of Teachers of Family Medicine Task Force created 26 competencies under five broad domains.<sup>20</sup> Since 1990, a paradigm shift has occurred, and other health care disciplines such as dental hygiene, pharmacy, physician assistant, physical therapy, nursing, and athletic training have constructed frameworks that were versions of the original competency-based model.<sup>21-26</sup> These programs' curricula were similar to Spady's definition of CBE<sup>1</sup> in that they are competency driven or outcome-based, but courses were fixed in time, knowledge assessments could be norm-referenced, instruction was sometimes teacher-centered, and rather than life-role competencies, they would generally be specific behavioral objectives.

### **LIMITATIONS**

This very structured, universal model that is embedded in athletic training programs presents limitations. For example, introducing knowledge and skills as distinct entities to be measured objectively presents students with an environment that loses considerable authenticity, resulting in poor transfer of learning. The art of rehabilitation and levels of interpersonal communication are skills very difficult, if not impossible, to observe and measure as competencies.

### **Applications**

In an attempt to maximize the learning experience and promote transfer of learning beyond the educational system while keeping within the walls of the competency-based athletic training program model, van Merriënboer and others introduced a design in the 1990s that may present a solution.<sup>27</sup> Their fundamental argument was to create simple (few elements) to complex (many elements) learning tasks. In athletic training, a simple task or competency may consist of conducting a knee evaluation where the process is carried out in its entirety, but the depth or extent of the evaluation is kept simple or elementary in content. The evaluation task would become complex when it includes multiple subjective and objective findings, demonstration of patient-practitioner interaction skills, documentation skills, injury management skills, and goal setting skills. Competency assessment in this model

requires a greater reliance on qualitative information versus objective scores obtained using checklists or rating. Establishing competencies with a vision of simple wholes to more complex wholes as opposed to specific behavioral objectives will provide a learning environment with greater authenticity and potential for transfer of learning.

## CONCLUSION

The purpose of this review was to explore the CBE approach used in higher education professional programs, including athletic training. Research conducted in the early 20th century suggested learning specific behaviors could be obtained through appropriate stimuli, but these behaviors were difficult to transfer between contexts. The CBE model was product-based, with its outcomes determined by the theoretical beliefs of reductionism or holism, and its framework derived from the scientific management process used in industry. Educational movements, including social efficiency, vocationalism, and essentialism, promoted the need for a specific, efficient, and standardized educational system.

The *Commonwealth Teacher-Training Study* of 1925 may have been the first CBE work published. This approach was an educational model driven by integrated behavioral objectives as outcomes measurable against pre-determined standards accomplished within flexible time parameters. Health care programs in American universities, under the present educational system, do not allow for a “Spady defined” CBE program to exist primarily due to time constraints and a framework consisting of specific elements as competencies. The emphasis in present professional education programs, such as athletic training, has been the use of quantifiable objectives as outcomes and a standardized approach.

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# Enhancing Clinical Evaluation Skills: Palpation as the Principal Skill

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**Context:** Recognition and evaluation of injuries/illnesses accounts for the greatest percentage (24%) of an athletic trainer's responsibilities as a clinician. When teaching orthopedic evaluation, we often emphasize history taking and special/ligamentous tests to achieve a diagnosis. Because of its complexity and variability, palpation becomes an underutilized skill in the evaluation process.

**Objective:** The intent of this article is to provide educators with some nontraditional instructional techniques to assist students' development of palpation skills.

**Background:** Palpation is used to identify somatic problems, treat those problems, and assess the result of the treatment. Within the examination, palpation identifies the specific tissues associated with an individual's complaint. By correctly identifying the affected tissues, the remainder of the evaluation can be shaped to appropriately address the injured structures. If students are able to comprehend the significance of palpation, they can enhance their evaluation skills.

**Description:** We describe four lessons (Anatomy of a Penny, Controlling Pressure, Discriminating Changes in Soft Tissues, Integrating Skills with Blindfold Palpation) to help instructors provide a foundation for, as well as to advance and integrate, palpation skills in the evaluation process.

**Clinical Advantages:** Education programs aim to enhance students' clinical abilities to recognize and evaluate injuries. The methods used to achieve improvement are not driven by accreditation standards, but by instructional technique. Nontraditional instructional methods may assist instructors with enhancing the palpation skills of their students.

**Conclusions:** Palpation is an integral skill in the evaluation process. With creative instruction, educators can help students advance their skills.

**Key Words:** critical thinking, analysis, synthesis, nontraditional instruction

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**A**thletic training is a health profession that has grown, matured, and diversified over the course of its short history. Athletic trainers once worked with a very small, focused population of athletes, but with our transformation to working among the physically active, we have expanded employment opportunities.<sup>1</sup> Exposure to varied populations has altered our scope of practice and required us to enhance the educational experience of future professionals. Although some may claim that accredited athletic training education programs are already saturated with competencies and proficiencies, we must use our curricula to expand students' knowledge beyond the foundation and into advanced thinking. Not only must we teach our students to analyze and synthesize information, but we must also enhance our skills as educators and utilize nontraditional teaching techniques to promote better learning.<sup>1</sup> Our purpose is to provide a theoretical rationale for improving palpation and to provide instructional lessons to enhance the teaching of the skill.

## BASIS OF LEARNING

Recognition and evaluation of injuries/illnesses accounts for the greatest percentage (24%) of an athletic trainer's responsibilities as a clinician.<sup>2</sup> Therefore, orthopedic evaluation courses are often one of the first courses provided in education programs. In teaching these classes, we must organize and condense information for students to quickly absorb the foundational knowledge. Then we should work to foster critical analysis so students can appropriately apply their knowledge to specific situations (injuries/illnesses).<sup>1</sup> Yet, this is no easy task, and it requires some instructional creativity as well as a comprehensive curricular plan grounded in critical thinking.

Critical thinking, first coined by John Dewey, recognizes the centrality of independent thought to substantiate learning and implies that learning occurs when one employs higher-order thinking.<sup>3-7</sup> Successful athletic training students need to demonstrate the ability to critically think; however, they must first acquire the foundational knowledge. Once true understanding is achieved, students need to be challenged to apply their knowledge to mock and real experiences. Upon application, students need to analyze and synthesize the feedback from patients to truly transform their learning.<sup>3,4</sup> It is this ability to apply their knowledge and experience in making discriminating judgments<sup>3</sup> that will define a good clinician.

As educators, it is important to provide situations and use instructional techniques that foster higher levels of thinking.<sup>5</sup> In the medical professions, where analysis leads to differential diagnoses and eventually to a treatment plan, we fail students and patients when we simply require memorization. In other words, knowledge is not enough. Comprehension and application<sup>6</sup> are crucial to successful clinical practice. When we teach and evaluate simple facts in the classroom but expect comprehension and application in the clinical setting, students are unable to make the connection. We, as educators, should challenge students to engage in higher-

order thinking during their professional studies, especially within their orthopedic evaluation courses as this domain consumes a quarter of their job responsibilities.

## UNDERSTANDING THE PURPOSE

When teaching the components of evaluation, history and special tests are two areas that receive great attention. History functions to direct the evaluation and special tests help to confirm or rule out diagnoses. Although each component of the evaluation process serves a purpose, clinicians must prioritize the components to perform during the evaluation. Palpation is often overlooked during this process, which may be a result of failing to understand its fundamental function.

Educators must help students understand the purpose, function, and importance of palpation.<sup>8</sup> Palpation is utilized for identification of somatic problems, treatment of those problems, and assessing treatment outcomes.<sup>9</sup> Within the examination, palpation identifies the specific tissues associated with an individual's complaint. By correctly identifying the affected structures/tissues, the remainder of the evaluation can focus on the injured structures. If students are able to comprehend the significance of palpation, their evaluation skills will improve.

When acquiring the skill of palpation, students start in a state of relative ignorance because they maintain only basic anatomical knowledge. With clear direction, students may develop the desire to learn more and eventually acquire the necessary technical skills.<sup>10</sup> Once students have obtained these skills, they must develop the ability to organize their findings and relate them back to the patient's symptoms. Once a student is able to maneuver this process with ease, the act of palpation becomes intuitive.<sup>10</sup> However, processing this information is often the most difficult skill for the student to establish. Learning palpation is like learning to read. At first, each word requires the identification of each letter, its phonetic value, and the linkages between each letter. As a person's ability to read increases, assessment of each word comes with more ease, patterns of words present themselves, and the significance of the sentence as a whole is appreciated. Similarly, as students learn how to palpate, they tend to focus intently on identifying the individual anatomical structures instead of feeling for tissue changes, eliciting pain, and finding other meaningful information. Educators can emphasize palpation fundamentals to enhance critical thinking.

## INSTRUCTIONAL TECHNIQUES

Educators should use specific and focused classroom activities to help students develop their palpation skills. These activities should be planned and sequenced to help students advance their knowledge from simply locating a structure to analyzing the tissue and comprehending the injury. The following lesson plans provide a sequence of instruction to help students improve their palpation skills.

## LESSON #1: Anatomy of a Penny

An introduction to palpation should include some basic directions on how to palpate and describe what the clinician is trying to identify.

### Objectives

1. Understand the purpose of palpation
2. Identify the best technique
3. Differentiate between anatomical structures

### Brief lecture (main points)<sup>11</sup>

- ▶ Palpation is the most commonly employed examination technique used by manual clinicians.
- ▶ There is more information obtained by palpation than any other method.
- ▶ Palpation forms a foundation to guide the other evaluation techniques (range of motion, ligamentous/special tests, etc.).
- ▶ Practice is needed to understand what the “touch” means.
- ▶ The skilled palpator is capable of discriminating between structures tactually and can integrate the information into an evaluation.
- ▶ The most sensitive means of palpating tissue is through the pads of the second and third digits.
- ▶ When palpating, you are comparing bilateral differences in skin texture, temperature, muscle tone and consistency, and tenderness to touch.
  - ◆ Bony landmarks may reveal changes in skin contour and alignment as well as potential abnormalities and tenderness to touch.
  - ◆ It is important to understand how much pressure is necessary. The early learner tends to use too much or too little pressure.

### Activity: Palpating a Penny

#### Supplies:

- ▶ pennies (one per student)
- ▶ 2”x2” squares of paper
- ▶ a hard surface (tables/desks)

#### Procedures:

1. Ask students to look at the penny and identify 2-3 differences comparing one side to the other.
2. Place the piece of paper over the penny. Try to identify if the penny is heads or tails (Figure 1).
3. To increase difficulty, you may ask the students to palpate the penny through 2-3 pieces of paper, cardstock, felt, etc.

#### Discussion Questions:

1. What side of the penny was easier to palpate? Why?
2. Describe what you were feeling for.
3. How did knowing the “anatomy” of the penny prior to palpating help you?
4. How does that translate to anatomical structures? What will the differences be when you palpate bone versus ligaments?

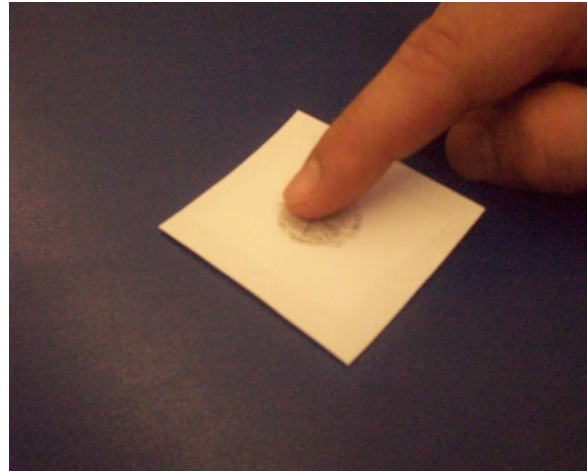


Figure 1. Palpating a penny with a paper cover (Lesson #1).

## LESSON #2: Controlling Pressure

The validation of palpation has been hampered by a lack of standardized guidelines<sup>12</sup> and overwhelming variability.<sup>8-9,13</sup> As such, techniques used to teach palpation should focus on improving reliability within and between practitioners. When trained, students retain information about applying correct pressure for up to one month.<sup>13</sup> Lessons focused on teaching students about depth of pressure are crucial for analyzing the tissue palpated.

### Objectives

1. Understand how to control pressure
2. Understand depth of pressure

### Activity A. What is One Pound of Pressure?

#### Supplies:

- ▶ 2-5 digital scales
- ▶ 2-5 stop watches
- ▶ pencils and paper

#### Procedures:

1. Work in teams of 3-4.
2. Ask students to place the pads of digits 2-3 on the scale.
  - a. Students should try to achieve the same amount of pressure on three attempts while a teammate records the pressure.
  - b. Students will likely have significant variability between each other and between each trial.
3. Repeat with eyes closed.
4. Bring students together to discuss variability between and within practitioners. Discuss what this means for patients and patient care.
5. Send students back to their teams. Ask students, one at a time, to apply 1 pound of pressure while a teammate times the practitioner (Figure 2).
6. Students should continue practicing to improve their times during each attempt.



**Figure 2.** Identifying one pound of pressure using a digital scale. (Lesson #2, Activity A)

**Discussion Questions:**

1. Did the variability between practitioners and attempts surprise you? How so?
2. What were some of the difficulties with controlling pressure?
3. Did people improve with each attempt? Why do you think this happens? What does this mean for you when you practice?

**Activity B.**

**Supplies:**

- ▶ phonebooks (1 per pair of students)
- ▶ spool of thread (cut 1-2" pieces of thread for each pair of students)

**Procedures:**

1. Work in teams of two.
2. Ask one partner to open the phone book and place the thread under the open page (Figure 3).

3. Ask the palpator to use the pads of their fingers to locate the thread.
4. Repeat the task adding more pages between finger pads and thread.

**Discussion Questions:**

1. How did the task become more difficult with more pages? What did you have to change about your technique to find the thread?
2. How can we relate this to anatomical structures? What are some deep structures that may require more pressure? What are we feeling for with these tissues?

**LESSON #3: Discriminating Changes in Soft Tissues**

Once students have acquired some basic palpation skills, they are more capable of transferring those skills to patients. However, students often palpate healthy tissue on healthy patients when they practice these skills. Classroom exercises that aim to simulate tissue changes may assure students that they are correctly palpating injured patients in their clinical education experiences.

**Objectives**

1. Identify what tissue changes feel like
2. Identify methods for identifying changes in soft tissues

**Activity: Palpating Licorice (Figure 4)**

**Supplies:**

- ▶ pencils and paper
- ▶ 10-25 pre-made licorice bundles (Pull-n-Peel Twizzlers™ wrapped in Saran Wrap™) simulating a distinct tissue characteristic (eg, normal, grade 1-3 strains, heterotopic ossifications [hard round candy needed])

**Procedures:**

1. Label the tissue characteristic on the underside of each bundle.
2. Work in teams of 2-3.



**Figure 3.** Understanding depth of pressure using thread and pages of a phonebook (Lesson #2, Activity B)



**Figure 4.** Simulating variable soft tissue injuries using licorice (Lesson #3)

3. Ask students to palpate the structures and attempt to identify the deformity.
4. Students should record the different characteristics of each bundle.
5. When everyone has had a chance to palpate, the students should compare their findings with each other and confirm the findings with the labels on the underside of the bundles.

**Discussion Questions:**

1. How successful were you at correctly identifying the deformity?
2. What were the more challenging deformities to palpate? Do you think this is common? Why or why not?
3. What other tools might you see clinicians at your clinical sites use to identify and treat soft tissue injuries?
  - a. Note that this line of questioning is optional and may be irrelevant based upon the tools used by your clinical instructors.
  - b. It is very important to discuss certifications and credentialing for specific techniques, like Graston®, to avoid the improper use of these tools.
    - i. How do these tools enhance our ability to sense change in tissues?
    - ii. What are the purposes of these tools?

**LESSON #4: Integrating Skills with Blindfold Palpation**

Once students have acquired the anatomical knowledge and can accurately locate structures and evaluate their findings, they will need to engage in exercises that integrate all of their other clinical skills.

**Objectives**

1. Enhance sense of touch
2. Improve communication between medical professionals
3. Improve anatomy/palpatations

**Activity: Blindfold Palpation (lower leg and ankle)**

**Supplies:**

- ▶ blindfolds (one for each student)
- ▶ handout with list of necessary palpations

**Procedures:**

1. Work in partners with one partner serving as the palpator and the other as the patient.
2. The palpator will palpate the structures of the lower leg and ankle while blindfolded (Figure 5).
  - a. The palpator will receive credit when they announce the structure to their patient.
  - b. The patient will record the structure on the checklist. If the palpator forgets to palpate a structure, the patient is responsible for directing the palpator to the structure without saying the name of the structure.
    - i. Example: if the missed structure is the base of the 5<sup>th</sup> metatarsal, the patient can say, “Please palpate beyond the distal attachment of the peroneus brevis and toward the common site for a Jones fracture.” The patient cannot say 5<sup>th</sup> metatarsal, styloid process of the 5<sup>th</sup> metatarsal, pinky toe, little toe, etc.
    - ii. Example: if the structure missed is the distal attachment of the tibialis anterior, the patient can say, “Please palpate distal to the ankle mortise where the muscle that acts to dorsiflex and invert the foot attaches.” The patient cannot say tibialis anterior, tibialis posterior, etc.
3. Partners should switch once all structures on the list have been palpated.

**Discussion Questions:**

1. Which structures were easiest to identify while blindfolded? Which were the hardest? Why do you think?
2. How did knowing the anatomy of the lower leg and ankle prior to palpating help you?
3. How did you modify pressure to palpate deeper structures? (Ask partners about depth of pressure: Was it enough? Not enough?)
4. Was anyone able to identify tissue changes in a classmate? Describe.



**Figure 5.** Blindfold palpations (Lesson #4).

## CONCLUSIONS

Recognition and evaluation of injuries/illnesses accounts for the greatest percentage of an athletic trainer's responsibilities as a clinician. In addition, textbooks and other literature emphasize the role of history taking and special/ligamentous tests. However, palpation remains an underutilized tool in the evaluation process. With some creative and sequenced instruction, we can help students advance this integral skill. The lessons provided herein will help instructors transition from teaching a basic understanding of palpation, to understanding pressure and identifying changes in tissues. The final lesson integrates skills and forces students into the higher-order learning necessary for advanced clinical practice.

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# Where Should Athletic Training Programs Be Housed?

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**Context:** Where a professional athletic training education program (ATEP) should be housed within a college/university has been a topic of discussion for many years. While individual institutions have unique preferences and priorities that suit its specific situation, it is essential that the field as a whole develops a consistent and cohesive model to guide ATEPs in their initial or continued development as programs. The current literature investigating the appropriate location of both undergraduate and graduate professional ATEPs is limited.

**Objective:** To begin a discussion on what ultimately will be the best situation to ensure the sustained growth of ATEPs and, therefore, the profession.

**Conclusion:** The current literature is inconclusive as to the optimal location for professional ATEPs within a college/university community. It is the author's opinion that undergraduate ATEPs should maintain their traditional place in physical education/kinesiology departments, as that is the most appropriate location for students to receive well-rounded, multi-disciplinary educational opportunities. Professional graduate ATEPs, on the other hand, should be housed in schools or departments of health sciences, because of the similarities between their two-year intense professional focus and those of other allied health fields.

**Key Words:** physical education, athletic training, universities and colleges, setting

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# Where Should Athletic Training Programs Be Housed?

Ted Eaves, EdD, ATC

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The athletic training profession has evolved significantly over the past sixty years. From the founding of the National Athletic Trainers' Association (NATA) in 1950 at a meeting attended by about 200 men, the profession has grown to more than 30,000 members, including over 24,400 certified athletic trainers.<sup>1</sup> The most significant changes over the years have occurred through attempts to improve the means by which athletic trainers are educated and prepared for entry-level employment.<sup>2</sup> Athletic training has grown from four NATA 'approved' undergraduate athletic training programs in 1969 to 368 accredited professional athletic training programs in 2010.<sup>1,3,4</sup> Athletic training education programs (ATEPs) were initially spawned from departments of physical education, with graduates originally taking a minimal number of athletic training specific courses while receiving general physical education degrees. Today, athletic training programs offer a highly specialized professional degree that must be awarded through a major specifically designated as athletic training by the institution no later than the 2014-2015 academic year.<sup>1,2,5-7</sup>

The NATA's Task Force on Education once suggested that although ATEPs were typically and traditionally aligned with and housed in departments of physical education/kinesiology, they should realign themselves with other health programs in a college of health-related professions.<sup>1,2</sup> While more than a decade has passed since this pronouncement, approximately 70% of ATEPs (both undergraduate and graduate programs) remain housed in departments of physical education/kinesiology, and only 24% of ATEPs are located in schools of health sciences.<sup>1,2</sup> The question then becomes, should athletic training programs follow the recommendation of the NATA's Task Force on Education and align with schools of health sciences, or should they remain in physical education/kinesiology departments?

The task force's rationale for programs to leave departments of physical education/kinesiology was predicated on the belief that physical education/kinesiology programs were becoming less financially viable, and that the considerable strain of meeting the rigid CAATE accreditation standards would require an already challenged departmental budget to absorb significant, additional resources.<sup>1,2</sup> The resources used to ensure that ATEPs meet accreditation standards and provide adequate educational opportunities for students appear to be more readily available in educational units designed to prepare other health professionals.<sup>1</sup> Furthermore, contemporary athletic training education is developed in a pre-professional manner more consistent with other allied health professions, which would make realignment into schools of health sciences seem appropriate.<sup>2</sup> The opportunity to share valuable, high-tech treatment and rehabilitation resources for educational purposes, that are considered abundant in allied health departments, is essential for a field that requires a rigorous accreditation process. Additionally, the connection with other health care fields, such as physical therapy or occupational therapy, would be useful for athletic training students because of the similarities in curricular content and the opportunity to gain valuable insight into the related fields.<sup>2</sup>

Realigning with health departments would also benefit ATEP faculty in their pursuit of tenure and promotion. If ATEPs realign with health care programs, then it is more likely that faculty

members would be evaluated for tenure/promotion based on the medical model, which includes teaching, service, clinical research, and/or clinical expertise.<sup>2</sup> ATEP faculty in departments of physical education/kinesiology may struggle to achieve promotion and tenure if these other components are not included, and if the administrative responsibilities required of program directors and clinical coordinators are not clearly outlined and rewarded in the tenure and promotion guidelines.<sup>2</sup> This is especially true at research-intensive institutions where greater scholarship demands are placed on faculty, and the medical model is not considered in tenure and promotion decisions.<sup>2</sup>

While health profession departments offer tangible benefits to ATEPs, their faculty, and their students, there are disadvantages to being housed in these departments as well. First, many health care programs (eg, physical therapy, occupational therapy) already housed in the department are graduate programs or entry-level professional programs. Since athletic training requires a baccalaureate degree for entry-level employment, there would be a significant difference in student profiles between ATEPs and the other allied health majors. The difference between undergraduate and graduate student traits, behaviors, and expectations may make it difficult for successful interaction and communication between programs, which would eliminate one of the primary benefits of relocating to allied health departments.

Allied health departments also tend to focus on and emphasize professional training as the principle component of the educational plan of study. While this form of training is quite useful for professional preparation, an undergraduate program should stress not only a well-rounded educational experience to ensure that students have a quality general education, but also an appropriate professional preparation. General education requirements are established at most colleges and universities, both at the institutional and at the departmental level. These educational requirements provide a sound foundation of knowledge that ensures students graduate with a depth and breadth of knowledge both in general studies and within the major. It is important that ATEPs continue to prepare well-rounded graduates and professionals.

The arguments both for and against the transition of ATEPs from departments of physical education/kinesiology to allied health departments are valid. While departments of allied health offer numerous benefits for ATEP programs, there are also disadvantages associated with relocating. When determining the most appropriate location for each individual ATEP, there is also a strong rationale for remaining aligned with their traditional home in the department of physical education/kinesiology, where they can continue to exist and even flourish.<sup>1</sup>

Historically, the field of physical education can take credit for providing opportunities to athletic training education that would not have been available otherwise, while also enabling the field to progress where it is today.<sup>1</sup> Physical education/kinesiology is a discipline, or body of knowledge, based on the study of physical activity. Athletic trainers are health care professionals who specialize in injuries that primarily result from being physically active.<sup>1</sup> This shared emphasis generates a number of logical links between the curriculum and research interests of both programs.

Another rationale for remaining aligned with physical education/kinesiology is the opportunity for students to gain a well-rounded education as a component of their degree program rather than solely prepare for professional employment. Taking courses that include philosophy/sociology of sport, exercise physiology, biomechanics, sport psychology, and motor learning that are normally found under the physical education/kinesiology umbrella, provides the student with a much greater depth and breadth of knowledge. Having an understanding of different aspects of physical education/kinesiology allows students to integrate multi-disciplinary skills and information into their professional practice that will benefit both them and their patients. Finally, remaining aligned with physical education/kinesiology departments allows ATEP students to maintain ties with the other undergraduate students in the department, thus fostering interaction, effective communication, a sense of a common purpose and goals, and a valuable support system.

While moving to an allied health department is not the clear-cut choice, there are also disadvantages to remaining aligned with physical education/kinesiology departments, many of which affect the department more so than the ATEP itself. First, the departments must review tenure and promotion procedures to decide if there are alternative strategies available to allow ATEP faculty a better opportunity to gain promotion and tenure. Physical education/kinesiology departments must also evaluate their financial resources and determine if it is feasible to meet the ATEP's needs in terms of accreditation and faculty expenses without causing resentment from other members of the department, especially in light of the significant budget cuts that currently face higher education.<sup>1</sup> Finally, ATEP administrators need to review departmental policies and determine if any of the benefits that allied health departments provide can also be offered in the physical education/kinesiology department. While there are many educators who believe that athletic training education can remain in the physical education/kinesiology departments if academic leaders are willing to be flexible and use creative solutions,<sup>1,2</sup> the individual groups of faculty at each institution must make the decision that is right for their situation.

While there are physically more undergraduate professional ATEPs than graduate level professional programs, graduate tracks are steadily gaining popularity nationwide. At this time, there are 23 accredited professional graduate programs, with several additional institutions either in the process of creating courses of study or transitioning their current undergraduate ATEP to the graduate level.<sup>2,8</sup> This shows an increase from 16 programs just three years ago.<sup>2</sup> The increased popularity is primarily attributed to a school's ability to attract students who would like to enter the athletic training profession after completing their undergraduate study in a different major, either because of a personal desire to change careers or because the student attended an undergraduate school that did not offer an accredited ATEP. Since there are significant differences between a graduate ATEP (a clinical program) and the typical master's degree program in physical education/kinesiology (a research or pedagogy program), an allied health/health sciences department may be the most appropriate location to house graduate athletic training programs.

Professional master's degree students should complete certain pre-requisite courses (such as anatomy and physiology) prior to acceptance into the ATEP. These courses provide essential foundation knowledge for athletic training students, but are not consistently included in the graduate ATEP curriculum. When these courses are removed from the ATEP educational program of study, there is no longer the curricular connection found between athletic training and physical education/kinesiology.<sup>1</sup> The focus of the professional master's degree program is squarely on professional preparation for a career in athletic training, requiring an intense curriculum and related clinical experiences that prepare students for BOC certification and a career in the field. This type of academic format is better aligned with schools of allied health/health sciences, which also have a specialized graduate curriculums leading to professional certifications.

## CONCLUSION

In my opinion, undergraduate ATEPs should be housed in physical education/kinesiology departments--their traditional homes and the best location for students to receive well-rounded educational opportunities. However, graduate level professional programs should be housed in schools or departments of health sciences, which offer the best educational opportunities for students in professional preparation program. Is this the correct answer? Only an open debate and discussion on the topic will help solve this dilemma and allow the educational field to continue its evolution.

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## INVITED COMMENTARY

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The authors have taken on an age-old discussion in athletic training, one that has occurred in many other allied and medical health disciplines: What is the best way to provide the education needed to train our health care professionals? During World War I, Mary McMillan developed the War Emergency Training Program for Reconstruction Aides using graduate nurses and physical education persons. This program was the first formalized didactic and clinical education program to educate the “medical gymnasts” who were the predecessors to today’s physical therapist. Integral to the development of the physician assistant profession, Dr. Henry McIntosh trained local fireman in emergency procedures for the community in exchange for their agreement to staff cardiac catheterization laboratories at Duke, while former Navy hospital corpsmen also were hired at Duke for similar roles as physician assistants. In 1959 when the Professional Education Committee’s recommendation to develop a model curriculum related to the employment of athletic trainers was approved by the NATA Board of Directors, the course work was designed to prepare students not only as athletic trainers but also as high school teachers, primarily in health and physical education. The three objectives of this program were to 1) give the individual the broadest teaching certificate possible, 2) provide pre-physical therapy courses that would be acceptable to AMA-approved physical therapy school, and 3) provide a curriculum that would prepare men in the management and prevent of athletic injuries. The commonality between athletic training and these other disciplines is that we all began providing formal education based upon the needs of the time and the available opportunity. Inherent in this comparison is the fact that the scopes of practice, education, and recognition of all of these disciplines, including athletic training, have evolved, and I would suggest that while the education of athletic training continues to evolve to match the expanding scope of practice of athletic trainers, the location of the educational programs has failed to follow suit.

To be fully transparent in my response and to disclose any possible bias, I should inform the readers that I have been a department chair and faculty member in the Duquesne University John G. Rangos, Sr. School of Health Sciences for over 17 years, and I have found this position not only beneficial to my students, but also to me and my colleagues who are senior faculty members in that school.

Athletic trainers were recognized as allied health professionals by the American Medical Association in early 1990. According to the Association of Schools of Allied Health Professions, “allied health professionals are involved with the delivery of health or related services pertaining to the identification, evaluation, and prevention of diseases and disorders; dietary and nutrition services; rehabilitation and health systems management, among others.” This definition closely mirrors the NATA’s definition of athletic trainers who are “health care professionals who collaborate with physicians to optimize activity and participation

of patients and clients. Athletic training encompasses the prevention, diagnosis, and intervention of emergency, acute, and chronic medical conditions involving impairment, functional limitations, and disabilities.” Conversely, if we accept the authors’ suggestion to keep undergraduate ATEPs in schools of physical education (PE) and kinesiology, it would appear that we would not be positioned to meet the description and educational content required by the profession. According to a commonly-used information site for perspective college freshmen, kinesiology is “less (of) a career than a conceptual framework with applications in athletic competition, health maintenance, rehabilitation or any work with a physiological basis.” It then could be surmised that even if a degree is awarded in athletic training, the perception of the public and potential payors will be that AT is part of the study of kinesiology which would not adequately describe the level of professional education and clinical expertise required of the Athletic Training health care professional.

The authors conclude that undergraduate programs should be housed in departments of PE/kinesiology because this will allow students to receive well-rounded, multi-disciplinary educational opportunities. They further conclude that entry-level master Athletic Training Education Programs (ATEPs) should be in schools of health sciences. I would suggest that this line of logic is inconsistent on several levels. First, both undergraduate and entry-level master ATEPs are required by the Commission on Accreditation of Athletic Training Education to contain the same professional content and skills. The author states that beyond the pre-requisite courses (eg, anatomy and physiology), there is no longer curricular connection between AT and Kinesiology/PE. The authors also suggest that courses in philosophy and sociology of sport, sport psychology, and motor learning courses will provide undergraduate AT students with a well-rounded education. I would suggest that a more well-rounded education would include not only the basic and applied sciences, but also a comprehensive liberal arts education that is often required in other allied health professional education programs. This more generalized curriculum would include courses in philosophy, speech, sociology, history, English, and general psychology as opposed to the more sport-specific versions suggested by the author.

The author also concludes that understanding PE/Kinesiology would allow students to integrate multi-disciplinary skills and information into their professional practice, but I would suggest that our undergraduate students would benefit more from sharing course work with other future allied health professionals. Not only would they have similar course content, but the students would also learn to work together and respect each others’ knowledge and skills, establishing a framework that will transition more easily into actual clinical practice. Finally, the author also express concern that PE/Kinesiology departments will need to evaluate their financial resources to determine the feasibility of maintaining accredited undergraduate programs. Working in a school of health professions for over 17 years, I can assure you that AT program costs, needs, and expectations are consistent with those shared by the other allied health disciplines in allied health schools across the country.

In conclusion, I encourage athletic trainers to continue to move their programs toward the education model recommended by the NATA's Task Force on Education more than a decade ago. I firmly believe that if we wish to provide our graduates with the best possible opportunities to meet the goals of the profession and afford them the respect and position that they have earned in health care, we must continue to allow our professional education to evolve just as other disciplines have done, and firmly establish our ATEPs in schools of allied health. This plan of action will not only benefit the students and the profession directly, but indirectly it will better position Athletic Training to achieve licensure in all states, be recognized by Medicare/Medicaid Services as an allied health profession eligible for reimbursement, and provide other payors with justification to reimburse athletic trainers for our services.

### **AUTHOR'S RESPONSE**

I would like to first say that I appreciate the ideas shared in this invited commentary. It is through these collegial dialogues that the discussion on the appropriate locations for ATEPs can be addressed and advanced.

There are several points against keeping ATEPs in Kinesiology/PE departments that are discussed in the commentary that I would like to respond to and clarify. First, the author suggested that housing athletic training programs in kinesiology departments would lead to the ATEP "not be[ing] positioned to meet the description and educational content required by the profession." Preparing students with the educational content to be successful and competent practitioners, and training them to meet and fulfill the NATA's definition of an athletic trainer is the responsibility of the ATEP and its faculty no matter where the program is housed. The departmental affiliation should not dictate or hinder the program's ability to produce qualified athletic trainers who are capable of meeting the NATA's definition for the profession.

The author also recommended that a comprehensive liberal arts based educational curriculum could be an adequate or even preferable alternative to the kinesiology curriculum if the ATEP were housed in an allied health department. Having graduated from a staunchly liberal arts university, I have a soft spot for this type of curriculum. While I agree that a liberal arts curriculum provides an excellent educational opportunity for students in the fields of philosophy, psychology, sociology, etc., it does not provide coursework in exercise physiology, biomechanics, motor learning, or other kinesiology courses that are essential educational pre-requisites for successful athletic trainers. Being housed in the kinesiology department offers access for ATEP students to these courses and the sport-specific versions of the liberal arts program. The kinesiology program presents ATEP students with the liberal arts and scientific courses that will help to make them well-rounded, multi-disciplinary scholars.

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Finally, the author suggested that housing ATEP programs in allied health departments provides students with the opportunity to collaborate with other students in similar fields. While, in theory, developing a collaborative learning relationship with physical therapy, occupational therapy, and physician assistant students would be a positive situation for all involved and could lead to improved working relationships among the professions in the future, it is important to remember that most other allied health professions require graduate degrees to enter practice. Undergraduate ATEP students would therefore be attempting to collaborate with graduate students in the other fields. Theoretically, this collaboration would be wonderful, but in practice it may be difficult to successfully intermingle students at different academic levels without inherent feelings of discomfort or even disdain appearing on both sides. Entry-level graduate students working collaboratively with graduate students in other allied health fields could lead to strong relationships and alliances between the various fields. However, I am concerned that the same could not be found in a department that includes students at different academic levels.

One solution currently being considered by some colleges and universities that may provide the ultimate resolution to this dilemma is to take the entire kinesiology department, including the athletic training program, and house it in a school of allied health. If there is no teacher education component involved in the kinesiology department, this may indeed be the ideal answer. The ATEP would be included in the allied health department, but it would still have full access to the courses and involvement with the students in the undergraduate kinesiology program. This may or may not be the solution for the future, but it does provide another option to consider for the athletic training field and its education programs.

# Service Learning in Athletic Training Education: It's About Time

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Recent attempts at bringing our profession to a global population have been nothing short of encouraging. But how do we gauge our effectiveness and impact? I often read with pleasure the efforts of my colleagues as they foray into countries previously untouched by athletic trainers. At first glance, it seems to be a slam dunk academically. Combining professionals with students, taking them to exotic locations and touring world famous landmarks is indeed a profound thing, and previously, something unheard of in our field. I recall as an undergraduate student desperately wanting to study abroad for a semester, maybe even a year, only to be told it was possible but it would set me back a year clinically. While pedagogically it was the right thing to do, not studying abroad was a difficult pill to swallow. Now, I proudly see that programs and institutions around the country are providing athletic training students with opportunities to study abroad and receive course credit for their endeavors, which I think is a beautiful thing. The kicker, however, is that this is only the first step.

There is a difference between study abroad programs and international service learning (ISL) courses. Study abroad opportunities do not necessarily incorporate direct patient care, which is where ISL comes into the picture. International service learning courses combine didactic and clinical components with meaningful, interactive community service and all with the added element of cultural immersion. For the purposes of educational advancement, enhancement, and global citizenry, numerous other health care professions, and majors for that matter, have made ISL courses a common practice in their respective disciplines. Service learning in our discipline, by contrast, is in its infancy. In order for us to make a profound impact on the world, we need to explore, and dare I say embrace, service learning in our curriculums. If we truly wish to affect our students, professionals, and fellow citizens of the Earth, we need to take the next big step. Why stop at travelling and passively observing other cultures when we can

actively impart our knowledge and skills on the physically active and injured? If you want to learn about culture or ethnic diversity, simply placing someone in another country does not ensure that learning will happen. Instead, we need to interact and do what we do best!

So what can an athletic trainer do to help others in a third world country? Evaluate and treat the musculoskeletal injuries we know and understand! I like to travel as much as the next person, but what really fires me up is when I help someone who does not speak my language. Stay with me here. I often tell students, "It doesn't matter if an athlete falls on a basketball court attempting a rebound and subluxes their glenohumeral joint, or a sugar cane worker falls off his burrow and subluxes his shoulder. Your evaluation and treatment methodology will be exactly the same!" What better classroom than the real world, right? We should allow students to use their evaluative and treatment skills, which we have taught and assessed in the classroom and on the field, on those people who so desperately need them. As a profession, we have finally embraced the fact that our students need to perform their skills under the auspices of a clinical instructor. Should it matter if we are on a football field or in a remote mountain village in the Dominican Republic? I respectfully submit that it should not. The student will always remember that first positive Lachman's test; however, they will arguably be fonder of the memory if it occurred in a foreign country and with someone who does not have access to health care. This is someone who can desperately utilize our services, and perhaps more poignantly, someone who immediately appreciates it.

Service learning can provide a bridge from the academic program to the profession, which perhaps students might have missed during "normal" clinical rotations. I say, let us go and change the world. Sounds hokey, doesn't it? But it is an absolute truth. We

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need to bring students to the poorest regions of the Earth and give them an education they will never forget. And what is the greatest by-product along the way? They will be helping and providing compassion for someone in pain and in need. They will also learn a trait that has taken me almost 30 years to acquire: perspective. Probably because it is seen as a weakness or a barrier to playing, but I have never seen an athlete smile from being fitted with a protective brace so they might compete. However, when I fit a brace on a farmer who is unable to walk up and down steep inclines because his knee “gives way,” I experience appreciation. I see it in the tears that stream down his face, in the hugs and kisses I receive from his wife, and in the invitation from his family to share in the coffee, beans and rice they cannot afford to give me. That, my esteemed colleagues, is perspective. That is a lesson no one, student or teacher, will ever forget.

Let us teach our students differently. Let us teach them better. I say get your hands dirty! I guarantee your students will love you for it, and at times, hate you for it. However, they will see drive and passion, and in turn, they will be driven and passionate. They will be, perhaps most importantly, compassionate. One of the complaints I hear most from clinical instructors is, “Today’s student just doesn’t understand. They don’t put in the work. They don’t get it.” I love that. I think they do get it, or at least they can get it, if we show them how. We cannot complain though if we do not show them how, or if we fail to let them physically utilize their skills. Is it really the student, or is it us? Maybe we do not understand. Our profession is evolving all the time. Our

environment, economy and athletes are evolving. If we do not recognize that, then is it really our students with the problem? It is so much easier to make it about them, but at some point, we have to look at us.

I know what you are thinking, and I have heard all of the terms out there as well: grassroots, evolve, education, etc. But here’s the funny thing, they work. So why not pick a project that literally encompasses every level of athletic training promotion there is? Let’s get out there. Are your students’ complaining their clinical instructors do not let them complete enough “hands on” activities at their clinical site? If so, create an opportunity that provides them with hands-on experiences. Talk to your local homeless shelter and set up a free musculoskeletal evaluation clinic. You would be surprised how far a smile, ACE bandage, and a few words of rehabilitative or treatment advice can go. Talk to your local free clinics. Do you feel ambitious? Do you want to travel abroad and bring students with you to provide supervised care? If so, look up your local non-profit organizations because athletic training might be the perfect fit. Service learning does not have to be international though. It can be just as satisfying spending a few hours working with those patients without health care in your local town as it is to flying off to some exotic (or not so exotic) location for a week or two.

Either way, we need to get this thing going. There is good work to be done.

# What Traits Make for an Effective Athletic Training Educator and Mentor?

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**Column Editor's Note:** A student's athletic training education often begins in the academic classroom, thus we must ask the question, "What traits make for an effective athletic training educator?" There is information available in the literature related to the quality of higher education faculty; however, this literature is limited in that the students' voices are heard, but typically through the eyes of the researcher who may or may not have his/her own agenda or bias. To address this limitation, I recruited two co-authors, each of whom have recently completed his/her undergraduate education in athletic training. To answer the aforementioned question, Burningham and Deru not only reflected on the experiences of themselves and their peers, but also examined pertinent literature related to effective didactic education.

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The educational preparation of athletic training students is a daunting experience for athletic training educators (ATEs) as they are often faced with many external (eg, accreditation, lack of resources) and internal (eg, lack of comfort with a subject area, role strain) challenges. Regardless of these challenges, the success of an athletic training student is a multi-faceted process, derived not only from the experiences they encounter in the academic classroom, but through exposure to diverse patient populations, healthcare providers, and high quality clinical instructors. A student's success is also obtained by engaging in and modeling the professional behavior of one's mentor(s), clinical instructor(s), and other well respected professionals.

A great deal has been published regarding athletic training students' clinical education experiences including the behavioral characteristics of effective clinical instructors,<sup>1-2</sup> selection of quality clinical education programming,<sup>3-4</sup> and the amount of time spent engaged in the clinical setting performing athletic training related skills and proficiencies.<sup>5-8</sup> In fact, an entire issue in the *Athletic Training Education Journal* (volume 4, issue 1) was dedicated to clinical education supervision. These published works lead us to an understanding of the many facets of quality clinical education. However, the literature pertaining to quality didactic education experiences of students has been somewhat neglected.

After examining related literature and engaging in several informal discussions with athletic training students, multiple themes emerged regarding the traits of an effective athletic training educator. The four main themes are: 1) student and educator communication, 2) facilitating critical thinking, 3) professionalism, and 4) responsiveness to students. Each of these traits is explored in more detail below.

## STUDENT AND EDUCATOR COMMUNICATION

Communication is the foundation through which all relationships are built. This is especially true between the ATE and the athletic training student. Student-educator communication is no longer confined to the traditional lecture.<sup>9-12</sup> As the paradigm shift towards technology in higher education continues, it is important for educators to stay connected with the students of the current generation who have become accustomed to quick information access and explanations through the use of the internet, instant messaging, and text messaging.<sup>13</sup>

Educators can and should use these technological advances to facilitate and enhance the learning environment. As with clinician-patient interactions, educators must utilize active-listening when interacting with students.<sup>9</sup> Educators must listen to their students to understand their perspectives on various topics and concepts within the athletic training profession.<sup>10-12</sup> When educators

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demonstrate effective listening skills there is often a respectful dialogue that naturally develops and leads to a strengthening of the student's education and a positive mentoring relationship is fostered. For example, listening to a student's perspective on a technique may result in new questions and thoughts on the part of the educator that, in turn, triggers the desire to investigate the topic further via research. In this way, the educator develops a level of respect for the student, and a mentor-mentee relationship begins to form.

Also, through actively listening to students, an educator can identify strengths and weaknesses (eg, test taking ability) of students. With this knowledge, educators can develop lesson plans and course activities that fit a variety of learning styles to keep students engaged and motivated within the classroom and increase the students' level of understanding of the course content.<sup>9, 13</sup>

How educators respond to students is also important in developing effective student-educator communication. An educator should not be condescending when answering questions or explaining concepts.<sup>11-13</sup> Nor should the educator express discontent when asked the same question repeatedly by students. Moreover, educators do not always express their thoughts in a manner that all students understand. The educator may need to use a different example for students to make a connection to a concept. Educators need to think back to when they were inexperienced students, and how new concepts (eg, pain theories) were completely abstract and difficult to comprehend, as if they were learning a new language. Patience and thorough explanations are important aspects of effective teaching; humiliating students will cause embarrassment and a lack of motivation.

The final key to effective communication revolves around educators being personable, but professional.<sup>9,11,12</sup> This factor, though often developed outside of the classroom, will translate back into the classroom. Educators must show students that they are human and more than a one-dimensional figure. Contrary to popular childhood belief, educators do have lives outside of school that consist of family, friends, and hobbies. Sharing just a bit of one's life experiences allows students the opportunity to better connect with the educator and will foster a mentoring relationship. Students and educators should not look for friendship; however, a personable and professional interaction is necessary for an enjoyable learning environment for both students and educators.

## **FACILITATING CRITICAL THINKING**

The next trait of effective educators is focusing on developing students' critical thinking skills.<sup>10,12-15</sup> Critical thinking has been defined as the use of higher-order thinking, where learning results from independently working towards a conclusion, rather than accepting another's finished product unchallenged.<sup>14</sup> It is the responsibility of ATEs to incorporate lesson plans that allow the student the opportunity to develop critical thinking skills early in their education. ATEs, however, should not feel like they have to go out of their way to accomplish this task. Educators can incorporate, within their current lesson plans, the connection between textbook theories to clinical practice

through case studies,<sup>16</sup> past professional experiences, and recent current events; asking the student, "How would you handle the situation?"<sup>9, 11, 16</sup> This simple connection may not necessarily be obvious to students, but after application to real-life situations, students will be able to relate and retain information better.

Once critical thinking is initiated, it must continue throughout the students' education. For this to occur and be monitored, goals or standards should be put in place across the curriculum for the student to reach.<sup>9-10, 14</sup> These goals or standards should be discussed between the educator and student on an individualized basis, with encouragement from the educator.<sup>12-13</sup> This encouragement does not need to be condescending, patronizing, or demeaning to the student; rather the encouragement should come in the form of the educator pointing out the positives the student has accomplished with the task at hand, but also challenging the student to think about possible solutions or inferences that can be drawn with regards to the situation.<sup>11,15</sup> For example, a student has successfully set up their first application of sensory-level TENS for acute low back pain. The educator may point out that the parameters were set up well, but ask the student what complications could arise from the treatment or what the next application would entail. By using this method of encouragement, students have a sense of accomplishment and self-worth, and are encouraged to learn more to be better professionals.

Another way for educators to encourage students' critical thinking is to involve them in writing case studies, conducting research, and/or participating in professional presentations.<sup>13-15</sup> While these are not of interest to all students, they are necessary to challenge students to expand their knowledge and skills outside of the classroom. When students are given more responsibilities outside of the classroom, they will also develop a sense of accountability and responsibility over what they learn and accomplish.<sup>10</sup>

## **PROFESSIONALISM**

Within athletic training education there are many cases where ATEs are considered to be experts, or leading professionals in their content area. While a master's or doctorate degree may validate individuals as professionals within their field and qualify them to teach courses related to their education, educators must bear in mind that professionalism and respect from the learner's perspective does not come through a degree. Respect is earned through demonstration of professionalism which can be fostered by maintaining certain behaviors and attitudes including staying current in the field and holding students and self to high standards.

Effective educators stay current and infuse new information into their classes. As evidence-based practice is increasingly incorporated into the profession of athletic training, professionals need to keep an open mind to new ideas and concepts. It is also important to remember that traditional approaches and techniques may be outdated, or that evidence may suggest a necessary change in evaluation/treatment practices. This open-minded nature needs to translate into the classroom as well, between students and educators. Students expect educators to learn along side of them by considering new philosophies

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presented not only in current literature, but also from student input. Students expect relevant, accurate, practical, and up-to-date information just like any other professional, and it is up to the educator to model this in the classroom.<sup>11</sup> Once this is accomplished, the educator will be able to gain respect and professional cooperation from students.

As discussed in the communication section of this article, nothing will destroy a positive learning environment faster than when the educator wants nothing more than to show the student how smart he/she is. The same holds true for those educators who hold students to high expectations of punctuality, preparedness, and professionalism; yet do not reciprocate the same level of expectation in their own conduct. Educators ought to be developers of life-long learning and should encourage students to become well-rounded individuals.<sup>10,13</sup> Educators ought to instill the concept of professionalism early on into those who are the future professionals in the field, and should be a reflection of what is expected.<sup>9</sup> From the concept of professionalism, educators can continue to foster the mentor-mentee relationship and can teach the student the importance of networking within the athletic training community; so as to “show them the ropes” of progressing in the profession and working with other professionals outside of their state or district.

## **RESPONSIVENESS TO STUDENTS**

Communication, critical thinking skills, and professionalism cannot, and will not, be obtained unless a sufficient level of responsiveness is provided to students. Being responsive to students involves both accessibility and approachability, and making time to address student needs.

Less effective educators are inaccessible.<sup>11</sup> They are always too busy for the learner and find excuses not to meet with the student, (eg, “I have a meeting,” or “Not now, I have too much work”) and do not offer to reschedule or find another time to meet with the student. They rarely make an appearance to the learner (beyond the 50 minutes they spend in class), and then rush through presentations and the teaching sessions. In essence, when ATEs are needed, they are never around.<sup>11</sup> In contrast, effective educators take the time to develop meaningful lessons that use instruction time in the most efficient manner possible. Effective educators involve the students and engage them in a lecture or lesson. These educators answer questions and take the initiative to investigate questions that they do not have answers to, rather than trying to skirt the issue. Office hours are abundant, and the effective educator will schedule meeting times with students, answer e-mails and phone calls promptly, and demonstrate their commitment to the students’ education on a daily basis. These educators are responsive to students and take the time to send emails of encouragement during difficult times; encouraging students to continue persevering even in the face of seemingly insurmountable challenges (eg, examinations), or simply to thank them for a great class.

Finally, effective ATEs will commit time to self-improvement. If communication and professionalism have been properly established in the student-educator relationship, honest and

constructive criticism can be communicated to the student when educators set apart time to discuss developments to be made. Athletic training students especially expect this from their athletic training program director. No academic program is perfect, but when athletic training program directors set aside time to discuss strengths and weakness of the program with students, again assuming that communication and professionalism is well established and respected, both parties will benefit from these improvements.

## **SUMMARY**

Effective educators are not authoritarians. The hands-on nature of classes, intimate class sizes, and close network of individuals requires educators to be mentors for their students. When educators are mentors, a higher level of communication and expectation will be established. Actively listening to students and taking their perspective into account will allow for a greater understanding of the student, the situation, and one’s self. Condescension should not be the hallmark of establishing control and dominance in the classroom. Rather patience and thorough explanation should rule the classroom and make it a safe and comfortable area for student development into an effective professional. The student-educator relationship can also be a personable yet professional one; that moves beyond the occasional smile while passing in the hallway. Going to work/school should be an uplifting experience, and can be one with a positive foundation in student and educator communication.

The job description of an athletic trainer requires an individual to be a critical thinker in order to effectively diagnose and treat an injury. Developing and fostering critical thinking skills is essential to becoming a professional and it is the responsibility of the educator to facilitate the development of these skills. Encouragement of critical thinking skills comes in a wide variety of educational projects, and the effective educator will employ at least one type within their lesson plans. One of the ways critical thinking skills can be encouraged in students is through the educator making the seemingly simple connection between textbook objectives and practical application a paramount objective in athletic training education.

Professionalism is a characteristic that needs to be taught to students and earned by educators. Professionalism does not come through receiving a degree, but rather how an individual conducts themselves. Effective educators must stay current within the realm of evidence-based practice and present the most current research to their students in hopes of making them effective professionals. Students expect high standards for themselves, and they expect these same high standards to be maintained by the educator. Educators must model the behaviors and attitudes they wish to receive in return. When this occurs a sentiment of respect is gained and the mentor-mentee relationship continues to be fostered.

Finally, the educator (as well as the student) must be willing to put in the time to work together and better the life of the other. Students should not be cast off and forgotten about but should have the opportunity to interact with their educators inside and

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outside the classroom. Effective educators involve and engage students in classroom discussion and encourage one-on-one meetings with students to promote their education. Taking the time to interact with students in such ways will not only foster the mentor-mentee relationship but will allow the educator to make their own self-improvements to become even more effective.

The foundations of athletic training were constructed from mentorships. It is important for this foundation to remain constant and resilient as the profession expands and matures in the coming decades.

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# Enhance Learning in Athletic Training Education with Audience Response Systems

Chris T. Harman, EdD, ATC

California University of Pennsylvania, California, PA

**A**udience Response Systems (ARS) are now being used to enhance learning in various higher education disciplines.<sup>1-4</sup> With several ARS brands available,<sup>5</sup> it is most important to consider various facets of this interactive technology prior to implementing it into your athletic training courses. This column will outline strategies to incorporate this learning tool into your classroom.

## THE PROBLEM

An instructor in an athletic training education program has a class of 90 students enrolled in a competency-based anatomy course. The large class size makes it a challenge for the instructor to not only engage the students and keep their attention but also to track their learning of specific content. The faculty member seeks a solution to increase student engagement and gauge their learning while leveraging the students' desire to use technology.

## AUDIENCE RESPONSE SYSTEMS

Audience response systems (ARS), also known as student response systems, or clickers, use software programs designed to increase student interaction, collect assessment data, provide each user immediate knowledge feedback, and generate higher ordered thinking and discussions. Current ARS brands include but are not limited to eInstruction®, i>Clicker®, Smart Response®, and Turning Point®. The company you choose will depend on information gathered from your Information Technology Department, University Bookstore, other faculty, your textbook publisher, and the ARS customer service representatives.

## ADMINISTRATIVE PROCEDURES

**Step 1:** Work with your Information Technology Department to determine the following: Current usage of ARS technology, current

ARS licensing agreements, availability of loaner ARS devices, and availability of overhead projection units and PCs (needed for radio frequency and web-based ARS) available in your classroom. Also check if ARS compatible software is downloaded onto your classroom computer and if ARS user training sessions are available on campus.

**Step 2:** Contact your bookstore regarding what ARS technology is currently available for purchase and for which courses. The bookstore administrators can also apprise you of any specific ARS equipment policies (purchasing of used clickers, return of defective clickers, disassembled textbook bundles). Also, some companies may require a preferred pricing agreement from your institution that assures a minimum purchase volume, resulting in decreased costs for your students. A plus side of this agreement, however, is the inclusion of faculty training sessions and technical support.

**Step 3:** Chose your operating system by contacting the customer service representatives of various ARS companies. It is important to discuss each system's compatibility with PCs and MACs. The program will need to be compatible to your hardware (eg, PCs, MACs), institutional software (eg, Microsoft, Apple), learning platforms (eg, Blackboard, Desire2Learn, WebCT), and any statistical analysis programs you plan to use (eg, SPSS, SAS).

**Step 4:** Determine which mode of ARS to use. Three standard ARS modes of communication are Infrared, Radio Frequency, and Web-based.

- ▶ Infrared (IR) devices require a clear line of sight from each device to the receiver. The range is approximately 90 feet, and the signal is only one way. This does not permit feedback to be sent back to each student.

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- ▶ Radio frequency (RF) devices require no line of sight to the computer-mounted receiver. Two-way communication back to the clicker allows immediate student feedback. The range from the devices to the computer receiver is 200 feet, and some brands have LCD screens on which text answers can be submitted. When compared to web based options, the RF devices are lower in cost per unit.
- ▶ Web-based (WB) devices require students to purchase website access. They can then view the class activity easily on their personal device (laptop, personal computer, Apple® iPhone®, iPad Touch®, Blackberry® smartphones). It is important to test the range in all class rooms using the WB system (wireless signals may vary between and within classroom buildings). Your institution's legal department may also require written confirmation from the ARS company, assuring that all student records stored externally will remain confidential and not be used for marketing purposes.

## PEDAGOGICAL BEST PRACTICES

After you have waded through the myriad of administrative steps, you must determine what you can accomplish with the technology. Teaching can be improved with critical thinking activities, pre- and post-assessment, cumulative assessment, polling, and statistical analysis. Learning can be improved through increased attendance and participation, understanding of course materials, peer instruction, increased retention, and student satisfaction.<sup>1-3, 6-8</sup>

### Start Small

Training is available by contacting your customer service representative. You may also find other faculty to form ARS learning circles. The group can meet every few weeks to trouble shoot best practices. It is important to take time to develop your familiarity and comfort level with your chosen ARS program, mode, and activities planned for your course. Mastering the use of ARS technology takes time. After learning how to set up a learning activity, add the new technology to the learning environment slowly. Start with simple polling questions (favorite TV show, sports team, or food) to allow students to learn to use the technology in low-stress situations.

### Data Collection

To use the ARS program for collecting student generated data, each ARS must be registered into the system. When using the RF with PowerPoint®, each clicker identification number must be entered. This can be completed by students if they purchase their personal ARS RF clickers or by the faculty if the clickers are institutionally owned. Web-based ARS can be registered online by each student.

### Assessments

Questions can be loaded at the beginning of class to test the students on the assigned readings. This strategy has the potential to increase on-time attendance, preparation for class, student

engagement, and cumulative examination scores. It also sets the tone for the daily lecture. If students show a need for information clarification from the readings, the lecture can focus on these key points.

### Peer Education

A great activity that increases student interaction and collaboration is peer education. A question is posed to the class, all students enter their answer, and the data is collected. The answers are hidden from the class and the faculty indicates the percentage of the class that answered incorrectly. The students are then shown the question on a second slide and instructed to talk in groups of three to determine the correct answer. Additional time is allowed for this activity. Students are then asked to resubmit their answer; the data is collected, and then shown to the class. This exercise increases group collaboration communication skills, improves critical thinking skills, and increases student engagement.

## OVERALL IMPRESSIONS

### Budgetary Considerations

ARS clickers owned by the institution can be a cost saving choice when used for several classes. Each clicker has an identifying number and can be assigned to a specific student in each course. The data are entered and stored by course name and number to facilitate data analysis at a later date.

### Faculty Productivity

It is highly recommended that your chosen ARS program be 100% compatible with your institutional learning management system (eg, Blackboard, Desire2Learn, Web CT, etc.). The efficiency of loading attendance and assessment data directly into a grade book or statistical program will increase your productivity. Specific education competencies can be align with assessment questions, and then downloaded for statistical analysis. This is especially important when assessing subsequent courses that are dependent on knowledge acquisition in anatomy. Incorporating this technology opens up new opportunities for all athletic training education courses in planning and documenting ongoing program assessment.

### Practice Makes Perfect

When first implementing ARS you may need to schedule additional course time to accommodate the administrative aspects of ARS. You will need to set aside time for distribution of equipment, troubleshooting, and follow-up impromptu discussions. As with any new technology, your efficiency will improve over time.

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## ADDITIONAL RESOURCES

The following list of resources will provide additional information to support your objective of incorporating ARS technology into your athletic training courses. These company websites and publications are a small sample of ARS companies, training opportunities, teaching strategies, and expected learning outcomes.

- ▶ Audience Response Systems, Inc.:  
<http://www.audienceresponse.com/>
- ▶ iRespond:  
<http://www.irespond.com/?gclid=CMfqkong9KUCFQY65QodwXkxsA>
- ▶ Meridi Audience Response:  
<http://meridiaars.com/?gclid=CNTt0Mnf9KUCFcNM4Aod6iWanw>
- ▶ Padgett Communications:  
<http://www.pcipro.com/?gclid=CMK1wOff9KUCFUGo4Aodkiq2nQ>
- ▶ Turning Technologies:  
<http://www.turningtechnologies.com/>

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## Current Literature Summary

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*Continuing education is mandatory to maintain BOC certification; however, there is a void in athletic training research regarding its efficacy in maintaining or enhancing professional competence. Presumably, one acquires new knowledge by attending continuing education programs. Hopefully this new knowledge is retained and translated into professional practice to improve patient care. Other health care professions, particularly nursing and medicine, have examined the efficacy of continuing education. We will provide brief synopses of current continuing education research and discuss possible applications to athletic training.*

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**Zahner SJ, Tipple SM, Rather ML, Schendzielos C. Supporting nurse preceptors through online continuing education. *J Contin Educ Nurs.* 2009;40(10):468-74.**

*Reviewed by David Berry, Saginaw Valley State University*

**Summary of research context and methods:** Community health nurses play a significant role in student learning and professional socialization, serving as nurse preceptors. Nurse preceptors engaging in on-site supervision and clinical instruction of undergraduate nursing students require adequate preparation and ongoing training to ensure appropriate levels of interaction; however, the preparation for the preceptor role by nursing programs appears to be challenged. The purpose of this study was to pilot the feasibility of using an adapted online continuing education course to increase knowledge and self-efficacy in nurse preceptors who work with student nurses in the acute and primary care settings. A one-group pre- and post-test repeated measures design was utilized. A pre-course electronic survey included demographic questions, one knowledge question (time 1) from each of the courses nine module quizzes, and a preceptor self-efficacy assessment instrument. Preceptors then completed nine self-paced online course modules examining a variety of educational topics affecting nurse preceptors in acute, primary and long-term health care settings. A four-item quiz was administered at the conclusion of each module, with one question repeated from the pre-course survey. Responses to the repeated questions became the post course assessment of knowledge gain (time 2). A course satisfaction assessment was administered after the completion of the nine modules. An invitation to complete a follow-up survey, including the previously used nine knowledge questions (time 3) and the same self-efficacy assessment instrument was sent out to participants at a later date.

**Summary of research findings:** Thirteen female participants (age = 47.92 [7.6] years practicing as a nurse = 20.77 [10.1]) completed all nine module quizzes and follow-up surveys. On average the modules took participants 34.62 minutes to complete with most of the modules completed on the participant's personal time. Knowledge gains between pre-test (time 1) and post-test (time 2) was statistically significant, as was between time 1 and time 3 (post-test). No statistically significant difference was noted between time 2 and time 3. The self-efficacy assessment instrument demonstrated good reliability (Chronbach's alpha=.938), however, no statistically significant difference in nurse preceptor self-efficacy was noted between the pre-test (time 1) and post-test (time 3). All but one participant agreed that the length of time to complete the course was acceptable and would be useful while all participants agreed or strongly agreed that the course was easy to access and was enjoyable.

**Implications for athletic training education/research:** The role of the nurse preceptor appears to parallel that of the approved clinical instructor (ACI) in athletic training. Concurrently, nursing programs, like athletic training programs, struggle with designing and implementing meaningful programming that prepares nurses for the preceptor role. Zahner et al suggest that the online continuing education program designed specifically for their target population was a feasible method for preceptor education; however, this appears to be only in the short term. The decline in participant knowledge between time 2 and time 3 suggests that the initial information learned was not completely retained though the reasons why are inconclusive; however, probable reasons may include lack of relevance to clinical practice, lack of accountability for not retaining knowledge, length of time between trials (approximately a 6 month average), and a small sample size. The literature does demonstrate that frequent refresher courses

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for cardiopulmonary resuscitation skills resulted in significantly shorter times to achieve proficient skills and when learners are encouraged to apply new knowledge to practice, the likelihood of becoming more proficient increases. Thus, the question one needs to ask is, "Could an online continuing education program for ACIs offered every 3-6 months with relevance to their role as an ACI improve knowledge retention and the ACI's ability to provide quality educational experiences?"

The methods by which an academic program addresses the CAATE standards for ACI training is obviously left to the discretion of each individual institution. However, a consistent online continuing education model to support the best practices of teaching and learning offered on a bi- or semiannual basis could be useful to improve ACI knowledge of and application of teaching and learning strategies in the clinical setting. When combined with athletic training program-specific online continuing education programming, practitioners wishing to serve as an ACI for multiple programs would no longer need to complete full training programs for each institution. Further research is needed to determine if this type of online educational programming would be feasible in athletic training education and whether this type of program would support ACIs and help to assure that athletic training education programs are providing quality educational experiences.

**Alemagno SA, Guten SM, Warthman S, Young E, Mackay DS. Online learning to improve hand hygiene knowledge and compliance among health care workers. *J Contin Educ Nurs.* 2010;41(10):463-71.**

*Reviewed by Phil Hossler, East Brunswick High School*

**Summary of research context and methods:** It has been reported that only 30-60% of health care workers comply with the Centers for Disease Control (CDC) and Prevention's established hand hygiene guidelines. Given that approximately 30% of hospital illnesses and deaths can be attributed to insufficient hand hygiene practices, it is paramount that current hand hygiene practices be assessed and resultant educational and behavioral reforms determined. This study assessed the effects of an online continuing education program on 256 health care worker's knowledge of hand hygiene guidelines and self-assessed behavioral changes in hand hygiene practices.

**Summary of research findings:** The online continuing education program resulted in significant improvement in hand hygiene knowledge and self-assessed practice. One area that showed the greatest improvement was knowledge of the effectiveness of alcohol-based hand sanitizers in reducing the spread of pathogenic bacteria on the hands. The fact that health care workers practice good hand hygiene less than 50% of the time is another area of notable knowledge improvement resulting from the online continuing education program. Ninety-seven percent of the participants implemented better hand hygiene practices following the online program.

**Implications for athletic training education/research:**

Increased hand hygiene awareness may be needed in athletic training ranging from instructor knowledge at educational institutions to practitioner compliance. The BOC Athletic Training Role Delineation Study states that athletic trainers and curriculum programs are expected to complying with regulatory standards

in order to minimize the risk of injury and illness. This requires knowledge of laws, regulations, and policies at the institutional, state, and national level regarding the maintenance of a safe and sanitary environment in compliance with established standards (eg, OSHA). Perhaps athletic training curriculum programs should re-emphasize universal precautions for both students and clinical instructors on an annual basis. Certainly, students and practicing clinical instructors could benefit from the convenience of an on-line review course in hand hygiene. The examination of changes in hand hygiene knowledge and compliance following an annual review course is suggested. Additionally, the assessment of athletic trainers' knowledge of hand sanitizing agents is warranted given that many practicing settings do not provide athletic trainers with immediate access to hand washing stations.

**Weiner SJ, Jackson JL, Garten S. Measuring continuing medical education outcomes: A pilot study of effect size of three CME interventions at an SGIM annual meeting. *J Gen Intern Med.* 2010;24(5):626-9.**

*Reviewed by Jennifer Doherty-Restrepo, Florida International University*

**Summary of research context and methods:** The Accreditation Council for Continuing Medical Education (ACCME) is requiring Continuing Medical Education (CME) providers to assess the impact of their programs. Effective the 2008-2012 accreditation cycle, CME providers must employ assessment strategies to evaluate the efficacy of their educational programs using criteria such as knowledge acquisition and retention, confidence, performance, or patient outcomes. The evaluation criteria set forth by the ACCME raises concerns regarding the feasibility of assessing the impact of CME provided at a national meeting. Therefore, this pilot study was conducted to determine the feasibility of using a survey to measure the impact of two workshops and one pre-course on knowledge acquisition, knowledge sustainment after 9-months, and comfort-level with the content presented.

**Summary of research findings:** Changes in knowledge and comfort-level were calculated as effect size, or a standardized difference. All three CME programs demonstrated immediate knowledge acquisition. One CME program demonstrated knowledge sustainment after 9-months while the other two programs demonstrated knowledge decay to levels below that which was acquired. Comfort-level increased in the pre-course and declined in the workshop.

The authors discussed the methodological and logistical challenges they encountered while conducting this pilot study. These challenges included the validation of the data collection instrument, low response rate, and the lack of resources and personnel to collect, process, and analyze the data.

**Implications for athletic training education/research:** The Board of Certification mandates the completion of continuing education units in an effort to maintain practitioner competence. Assessing the efficacy of continuing education programs is warranted given the need to sustain and improve professional competence in the dynamic field of health care; however, it may not be feasible at national meetings. In athletic training research, examining the effects of different instructional techniques on continuing education outcomes (eg, knowledge acquisition, knowledge retention, and/or patient outcomes) while taking

into account the learning style preferences of athletic trainers is needed. This line of research could identify improved continuing education programming capable of achieving effective learning outcomes.

**Murray S, Cytryn KN, Barrett TJ, Meinzer RL. Outcomes evaluation of a skill-based workshop targeting the use of spirometry in chronic obstructive pulmonary disease. *CE Meas.* 2010;4:50-7.**

*Reviewed by Kirk J. Armstrong, Georgia College & State University*

**Summary of research context and methods:** Chronic obstructive pulmonary disease (COPD) affects more than 12.1 million Americans, with an estimated cost of \$49.9 billion. Spirometry provides a sensitive and objective means to assess a patient's respiratory status; however, many primary care physicians are not familiar with this method of assessment nor do they use it to adequately assess respiratory functioning. To address these practice gaps related to spirometry, the American Academy of Family Physicians sponsored a continuing education initiative consisting of a printed summary of current research and recommendations for clinical care; a hands-on, case-based workshop related to conducting and interpreting spirometry testing; and an interactive, case-based online program extending the workshop case through follow-up over time to foster further learning and validation. Effectiveness was assessed through a mixed methods approach, including qualitative interviews pre- and 3 months post-workshop and quantitative questionnaires pre- and immediately post-workshop, as well as 3 months post-workshop.

**Summary of research findings:** Overall, workshop participants showed an increase in their knowledge and confidence in skill and clinical use of spirometry to diagnose COPD, while acknowledging an ongoing lack of knowledge and skill in using spirometry to monitor COPD and interpreting spirometry to influence treatment decisions. Post-workshop evaluations suggested that the hands-on workshop resulted in self-reports of increased confidence and an intent to use spirometry.

**Implications for athletic training education/research:** Like physicians, athletic trainers participate in a myriad of continuing education (CE) activities to bridge gaps in knowledge and skill to clinical practice. This article supports the need for interactive, hands-on CE activities that enable athletic trainers to engage directly with the presenter and necessary equipment to increase knowledge, skill, and confidence related to its use. To effectively bridge knowledge to practice, athletic trainers need to identify the gaps (ie, learning needs) and participate in CE activities that are designed to improve these specific deficits in their clinical practice.

**Telner D, Bujas-Bobanovic M, Chan D, et al. Game-based versus traditional case-based learning: Comparing effectiveness in stroke continuing medical education. *Can Fam Physician.* 2010;56:e345-51.**

*Reviewed by Stacy E. Walker, Ball State University*

**Summary of research context and methods:** This investigation evaluated family physicians' enjoyment of and knowledge gained from game-based learning versus traditional case-based learning in a continuing medical education (CME) event on stroke prevention and management. Thirty two family physicians and 3 senior residents (N = 35) watched a 30 minute video about stroke prevention and management and were then randomly assigned into two groups (n = 17 case-based group; n = 18 game-based group). Both groups were then further divided into smaller groups of five or six. The case-based groups discussed cases regarding the content seen on the video within their respective smaller groups. The game-based groups played a board game called "Snakes and Ladders." All participants immediately, and then three months later, took a 40-point multiple choice knowledge exam and answered 11 statements about their enjoyment of the event, subjective learning, and whether they would attend similar future CME events.

**Summary of research findings:** Results showed no statistically significant difference between the case-based and game-based learning groups' scores on the knowledge exam immediately or at three months. Participants in the game-based group did report higher levels of satisfaction with the CME event (strongly agreed that the event was enjoyable [game-based = 94%; case based = 53%], that their attention was high throughout the event [game-based = 88%; case-based = 41%], and that they would register for a similar event in the future [game-based = 82%; case-based = 41%]).

**Implications for athletic training education/research:** These findings present an opportunity for continuing education providers to consider using game-based and case-based learning as modes of delivering continuing education content. Athletic training needs research similar to this to identify the short-term effects (eg, knowledge, patient care) of a continuing education event. Longitudinal studies are also needed to identify the long-term effects of continuing education on patient care. Lastly, barriers to implementation of knowledge and skills learned during continuing education needs to be investigated to identify and address such barriers.