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ORIGINAL RESEARCH

Student Knowledge, Attitudes, and Use of Evidence-Based Concepts Following an Educational Intervention

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Context: While evidence-based practice (EBP) concepts are being taught in health profession education programs, models of instruction and effectiveness of these models are not evident in athletic training.

Objective: To evaluate the effectiveness of the Evidence-Based Teaching Model (EBTM) in increasing student knowledge, attitudes, and use of evidence-based concepts.

Design: Within subjects design with pre- and post-test evaluations of students' knowledge, attitudes, and intended use using the researcher-developed Evidence-Based Concepts: Knowledge, Attitudes and Use (EBCKAU) survey. Setting: CAATE-accredited undergraduate programs.

Participants: Eighty-two students from a stratified purposeful sample of 9 institutions were enrolled in the study, 78 students (95%) completed the knowledge portion of the survey, while 68 students (83%) fully completed the knowledge, attitudes, and use portions of the survey.

Data Collection and Analysis: The EBCKAU survey was used to assess student factors relating to EBP through multiple choice, Likert scale, and open-ended questions.

Results: Students significantly increased their knowledge, confidence in knowledge, familiarity with, and confidence in use of EBP skills following the EBTM. Prior to the EBTM, students earned a mean knowledge score of 50%. This improved to 66% post-EBTM. Students' interest and perceived importance scores did not increase. Barriers to student use of EBP included time, available resources, ACI open-mindedness, and experience.

Conclusions: The EBTM was effective in improving student factors related to knowledge and use of EBP concepts. To our knowledge, this is the first published teaching model that assessed student outcomes related to EBP in athletic training education.

Key Words: evidence-based practice, competencies

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Infusion of the knowledge and skills related to evidence-based practice (EBP) in health care professional education programs is needed to promote current clinical practice and quality patient care.[1] As a core component of educational curricula,[2-5] EBP promotes critical thinking among students through integration of patient values, best available evidence, and clinician expertise.[6] Specific to athletic training (AT), these components of EBP should be taught in educational curricula to provide a more scientific base for clinical practice.[7]

Recently, the National Athletic Trainers' Association (NATA) began increasing resource availability for athletic trainers to begin incorporating EBP into clinical practice. These resources center on improving accessibility to current, high quality, evidence-based research through databases, forums, and continuing education opportunities. Implementation of the EBP process and associated concepts in the clinical setting and professional education is necessary as we continue to seek third-party reimbursement, demonstrate effective athletic training methods, increase the presence of evidence in our literature,[8] promote critical thinking, and enhance our reputation within health care.[7] Students enrolled in Commission on Accreditation of Athletic Training Education (CAATE)-accredited programs should have significant exposure to EBP, as they will be future leaders of the AT profession.[7,9]

Curricula and continuing education opportunities of other health care professions have focused on increasing students' and professionals' abilities to find, analyze, and utilize research evidence to improve individualized patient care.[10-13] To assist instruction of these concepts, specific teaching strategies have been developed in medicine,[2,3,5] nursing,[14,15] occupational therapy,[16,17] and physical therapy.[18] These strategies are typically profession-specific, focus on the process of EBP, and have varied manners of delivery such as short courses, weekend workshops, and online modules.

To further promote inclusion of EBP, the Committee on the Health Professions Education Summit (2003) established competencies that health care practitioners should incorporate into clinical practice including: 1) patient-focused care; 2) interdisciplinary collaboration; 3) use of EBP; 4) improving quality of care; and 5) use of technology to obtain information.[4] Similarly, athletic training education has added EBP competencies by including many concepts specifically related to the EBP process in the 5th edition of Athletic Training Education Competencies.[19]

Other studies in the medical,[2,5] nursing,[14] occupational therapy,[16] and physical therapy,[20] fields have evaluated EBP knowledge and attitudes following EBP academic and clinical training, and have noted a change in knowledge but not in attitude or behavior. Evaluation of teaching strategies in these professional programs demonstrate that gains in knowledge and skills can be seen via EBP infusion in semester courses,[5] clinical rounds,[2] and practicum courses.[14] Unfortunately, these studies do not illustrate changes in attitudes or behavior, perhaps due to the fact that subjective changes such as these take time to be seen. Each of these studies evaluated attitudes and behaviors immediately upon completion of the course, thus not allowing enough time to apply the knowledge and skills gained from EBP instruction.

In comparison, EBP concepts are somewhat new to athletic training, and no incorporation of EBP studies exist in the athletic training literature.[21] Therefore, it is not known whether there will be improvement in student knowledge, attitudes, and use. The athletic training profession needs information regarding these topics in order to fully implement EBP. Because behavior change occurs over time, it is essential that our students in professional education are engrained with the knowledge of EBP concepts, so that EBP-associated behaviors can be reflected in future practice. Therefore, the purpose of this study was to implement an innovative teaching strategy, the Evidence-Based Teaching Model (EBTM), in select ATEPs to determine its effectiveness in improving student knowledge, attitudes, and use of EBP concepts. Please refer to *Educator perceptions of the Evidence-Based Teaching Model in undergraduate athletic training education* on pages 76-87 of this issue for a complete description of the EBTM.

METHODS

Study Design

We employed a within subjects study design with pre- and post-intervention evaluations of students' EBP knowledge, attitudes, and intended use via the *Evidence-Based Concepts: Knowledge, Attitudes, and Use* (EBCKAU) survey. Athletic training students were enrolled in a therapeutic modalities or rehabilitation course at one of nine CAATE-accredited institutions during the time of participation.

Participants

The EBCKAU was administered to a stratified purposeful sample of 9 CAATE-accredited programs representing 5 NATA districts. Eighty-two students consisting of 33 males and 49 females (20.18 ± 1.12 yrs), with an average ATEP semester enrollment of 2.30 ± 1.15, and an average GPA of 3.13 ± 0.42 completed the instructional sessions for a 100% participation rate. Please see Table 1 for further demographic information. Due to the self-report nature of GPA obtained in this study, a one-time Family Educational Rights and Privacy Act (FERPA) form was not completed. Students were excluded from section analyses (knowledge, attitudes, or use) if they did not fully complete part of a respective section of the EBCKAU survey. For example, if a student did not answer all Likert-scale items for attitudes, they were not scored for the

Table 1. Participant Demographics (N = 79)

Institution	NATA District	Course of Implementation	Number of Students	Mean GPA (SD)	Mean Semesters Enrolled in ATEP (SD)	Instructor Teaching Experience (Yrs)
A	4	Modalities	7	3.31 ± .41	4.00 ± .58	10
B	4	Modalities	10	2.84 ± .35	1.40 ± .84	5
C	4	Modalities	12	3.14 ± .53	1.08 ± .29	14
D	2	Rehabilitation	12	2.91 ± .43	1.92 ± .29	10
E	9	Modalities	9	3.14 ± .31	2.11 ± .33	3
F	3	Modalities	6	3.19 ± .37	2.83 ± .41	3
G	6	Rehabilitation	7	3.19 ± .25	4.43 ± .98	10
H	6	Modalities	4	3.20 ± .66	3.00 ± .82	5
I	3	Modalities	12	3.39 ± .25	2.07 ± .27	16

entire attitude section, though were still evaluated in knowledge and use. Seventy-eight students (95%) completed both pre- and post-*knowledge* portions of the EBCKAU survey, and 68 (83%) completed all sections of the survey. Approval for data collection was obtained from the human subjects committee at the university where the EBTM was developed and participating schools when applicable.

Knowledge of EBP concepts, as related to treatment decisions, was addressed through 6 multiple choice questions and 1 fill-in the blank question, for a maximum knowledge score of 7. *Attitudes* were assessed through Likert-scale items relating to familiarity, confidence in use of EBP concepts, student interest in, and perceived importance of EBP. Scales included four ordered choices ranging from "1," which indicated "Not at all," to "4" which indicated "very" for the sections of familiarity, confidence, interest, and perceived importance. *Use* of resources were measured through checklists and ranking of items that students regularly use to conduct EBP, such as course notes, peer-reviewed articles, previous experience, and discussion with their Approved Clinical Instructor (ACI) or Clinical Instructor (CI). Additionally, use was evaluated through open-ended questions regarding the sub-categories of perceived barriers to use and intended future use of EBP concepts. Demographics included questions to describe the sample and to determine representation of the population.

Instrument

The EBKCAU survey was developed by the research team, and was used to assess student knowledge, attitudes, and use of EBP concepts. Each of these categories was assessed via separate sections of the survey. Topics assessed within the category of attitudes included familiarity, confidence, interest, and perceived importance, while the use category evaluated future intended use and perceived barriers to utilization of EBP. Figure 1 depicts the specific content areas addressed by each section of the survey.

The EBCKAU Survey was examined for content validity through blueprint design and examination by a panel of athletic trainers. In a previous pilot study (n = 86), reliability of the EBCKAU survey was determined in a sample of students enrolled in therapeutic modalities or rehabilitation courses. The knowledge section was analyzed using Kuder-Richardson (K20) analysis for internal consistency of multiple choice items, and percent agreement for fill-in-the-blank. Knowledge multiple choice questions achieved consistency values per question ranging from .360 to .786, with an overall K20 value of .250. The fill-in question on the knowledge section earned a percent agreement of 100%, as all students answered this question incorrectly on both administrations. Cronbach's alpha was calculated for the ordinal data with values for familiarity (α = .814), confidence in use (α = .813), interest (α = .669), and importance (α = .707), for an overall attitudes section reliability of satisfactory, at the value of .70 or higher. Reliability of barriers and intended use were not conducted due to the qualitative nature of information collected in these sections.

Procedures

The EBCKAU survey was administered by participating instructors in the associated therapeutic modalities or rehabilitation classes both prior to, and within two weeks of completing, implementation of the EBTM. Delivery of the EBTM occurred over 2 or 3 days

Knowledge Section	EBP process in treatment decisions
Attitudes Section	Familiarity with EBP process
	Interest in EBP process
	Perceived importance of EBP process
Use Section	Confidence in use of EBP process
	Intended future use of EBP process

Figure 1. EBCKAU Survey Areas of Evaluation

of either therapeutic modalities or rehabilitation due to the decision-making nature of these courses. In addition to a lecture, the EBTM required students to complete various assignments including article review, formation of a clinical question, in-class discussions, and discussions with clinical instructors. Given the time lapse from implementation to completion of the EBTM, the average time between survey administrations was 4 weeks.

Each survey included a front page instructional sheet which was read as a script to students by the instructor. Students were instructed to tear off the instructional sheet as a record of their consent to participate in the survey. Upon completion of the post-survey, the instructors mailed all survey and EBTM assignments back to the primary investigator, where they were kept in a locked filing cabinet. Appendix 1 illustrates the EBCKAU survey in its entirety.

Data Analysis

Normality of the data was obtained through descriptive statistics of means, standard deviations, and frequencies. A paired t-test was used to determine differences in knowledge scores from pre- to post-EBTM implementation. Wilcoxon matched pairs signed ranks were used to assess differences in familiarity, confidence in use, interest in, and importance of EBP concepts. Pearson product-moment correlations (r) were used to determine relationships between knowledge change scores and student factors of number of semesters accepted in an ATEP and GPA, as well as instructor teaching experience. Spearman's rank correlations (p) were used to detect relationships for familiarity, confidence in use, interest, and importance with the same student and instructor factors previously described. Additional categories of barriers and future use were analyzed qualitatively for patterns of student responses. Axial coding was employed to determine appropriate categories within answers to these questions. A value of P=0.05 was set a *priori* to indicate statistical significance. Data analyses were conducted using SPSS v.16.0.1 *(SPSS Inc. Chicago, IL).*

RESULTS

Knowledge

Of the 82 students enrolled our study, 78 completed both pre- and post-EBTM *knowledge* portions of the EBCKAU survey for a 95% response rate. Prior to implementation of the EBTM, students had a mean knowledge score of 50%, showing that they had low knowledge of EBP concepts. Post-implementation, the mean percentage increased to 66%, for a significant increase in overall knowledge ($t_{1,77}$ = -6.39, $P < .001$, $d = .72$) with a moderate effect size; the confidence interval for this mean was between -1.50 and -0.79 (Table 2). Average overall knowledge change scores were equivalent to an increase in total score by 1 point with a range of -2 to 5, while 23% of participants increased their score by 3 points or more.

Student confidence in EBP knowledge also increased significantly from pre- to post-BTM implementation (z = -7.04, $P < .01$). The mean pre-intervention confidence in EBP knowledge score was 14.06 ± 3.33. Following EBTM implementation, the confidence in EBP knowledge score increased to 21.03 ± 3.27 (Table 2).

There was no significant relationship between semesters accepted in an ATEP or GPA and knowledge change scores. Additionally, no correlation was identified between instructor years of teaching experience and student knowledge change scores.

Attitudes and Confidence in Use

For the attitudes and confidence in use portions of the EBCKAU, only 68 responses were used due to full completion of the scale (see Table 3). Significant differences were found in students' *familiarity* (z = -6.55, $P < .01$) and *confidence in use* (z = -6.37, $P < .01$) of EBP following implementation of the EBTM. *Familiarity* mean pre- and post-intervention scores were 12.34 ± 2.94 and 16.10 ± 2.22, respectively; while *confidence in use* means were 12.19 ± 2.95 pre- and 15.59 ± 2.05 post-EBTM.

Student interest and perceived importance were not significantly influenced as a result of the EBTM. Additionally, no significant differences were identified for number of semesters accepted in an ATEP or GPA and familiarity, confidence in use, interest in, or perceived importance of EBP concepts. A negative correlation was identified for confidence in use of EBP concepts and instructor years of teaching experience (r = -.29, $P < .05$). No correlations were found between years of teaching experience and familiarity, interest in, or perceived importance.

Barriers and Intended Future Use

Several patterns emerged through the open-ended questions relating to barriers and intended future use of EBP resources. Students were asked to identify specific barriers to their use of EBP resources; the most common answers were expressed as time, available resources, relevance of literature to the athletic population, ACI/CI open-mindedness, and agreement with class information. Samples of student responses are provided below.

Table 2. EBCKAU Knowledge Scores (N = 78)

Portion of EBCKAU	Maximum Possible Score	Pre-Test Mean (SD)	Post-Test Mean (SD)	*P*-Value	Change Score	Effect Size	95% CI
Knowledge	7	3.49 ± 1.28	4.63 ± 1.27	< .001	1.14 ± 1.58	0.72	-1.50 to -0.79
Confidence in Knowledge	28	14.06 ± 3.33	21.03 ± 3.27	< .001	7.15 ± 3.90		

* Indicates statistical significance at $P < .05$

Table 3. EBCKAU Attitudes and Confidence in Use Scores (N = 68)

Portion of EBCKAU	Maximum Possible Score	Pre-Test Mean (SD)	Post-Test Mean (SD)	Change Score	*P*-Value
Familiarity	20	12.34 ± 2.94	16.10 ± 2.22*	3.76 ± 3.06	< .001
Confidence in Use	20	12.19 ± 2.95	15.59 ± 2.05*	3.40 ± 3.05	< .001
Interest	20	15.62 ± 2.87	15.60 ± 2.70	-0.01 ± 2.98	> 0.05
Importance	20	16.01 ± 2.95	16.24 ± 2.75	0.22 ± 3.32	> 0.05

* Indicates statistical significance at *P < .05*

The largest barrier I see is that when treating an athlete I don't foresee myself going to look up literature between evaluation and treatment.

EBP is not always in agreement with what we have been taught in class.

We might not have computers or any other way to find evidence-based information and lack of knowledge.

I think the only barrier is the ACI in charge who is not open-minded.

Not every athlete is the same. The subject used in the research may be completely different from your athlete.

Students also identified their intended use of EBP skills and knowledge in their future during graduate school, if a treatment was not working, with chronic injuries, and during discussions with peers or ACI/CIs. Specific student comments included:

If I have a chronic injury that seems that other treatments are not being successful.

Whenever I find what I'm doing isn't working or whenever I'm not sure of a treatment plan, or in special consideration athletes.

I see myself using it to stay current with treatment protocols and for providing my athletes with optimum care.

I will take EBP into any discussions I have with my head ACI and use their opinions to influence my decision making.

I would use EBP skills in determining which modalities will work best with my different individuals. It will also help me in the decision process as well as in normal treatment of the individual.

Students also indicated via lists that they use the following resources more than 2 times per week both when studying and determining treatments: course notes, discussion with ACI/CI, classmate conversation, textbooks, and previous experience. General web-sites also were provided as a resource students use more than twice per week when studying, but not when determining patient care.

DISCUSSION

We anticipated that athletic training students would have limited knowledge of EBP prior to EBTM instruction, with associated low familiarity, confidence, interest, and perceived importance. Based on our results, athletic training students benefited from instruction of EBP through the EBTM, particularly in the areas of knowledge, familiarity, and confidence in use of EBP. As with other research findings regarding attitudes toward EBP,[22] the EBTM did not appear to increase students' interest in or perceived importance regarding EBP.

Knowledge

Evidence-based practice concepts are relatively new to students within CAATE-accredited programs. As demonstrated on the EBCKAU, initial student knowledge was low at 50%, representing 3.5 questions correct out of a possible 7. Following implementation of the EBTM, student knowledge increased an average of 1 point to 66%, or the equivalent of 1 letter grade. While the final knowledge score obtained in our study is still somewhat low, it is similar to findings of teaching strategies in other professions. For example, Wanvarie[2] found that medical residents had an average score of 63% (out of 30 multiple choice questions) following a full semester course on EBP. Additionally, Thom et al[22] showed increases in knowledge following a two-week residency rotation. Burns and Foley[23] qualitatively reported that freshman nursing students improved knowledge and skills following a semester course in EBP.

We should note that the knowledge portion of the EBCKAU was composed of questions relating to the 5-step EBP process, thus representing the introductory concepts of EBP. Knowledge was evaluated at the lower levels (remembering and understanding) of the revised Bloom's Taxonomy.[24] The EBCKAU survey was not designed to assess higher levels of learning, such as applying and evaluating EBP,[24] nor did we target statistical concepts of EBP such as sensitivity, specificity, or likelihood ratios.

We hypothesized that there would be no significant difference in knowledge in relation to GPA and number of semesters enrolled in an ATEP. The observed increase in knowledge (from 50% to 66%) across student demographics may illustrate that students had similar levels of knowledge at the time of initial assessment (pre-EBTM implementation), and therefore, were capable of similar amounts of increase in knowledge following the intervention.

Attitudes and Intended Future Use

The EBCKAU student interest and perceived importance scale scores of the attitudes section were high during the pre-test, with values of 16.01 and 16.04, respectively, indicating that EBP concepts were "very" interesting and important to students. Because the maximum possible score on the interest and importance scales was 20, there was a ceiling effect for these section scores. Familiarity with and confidence in use were appropriately low during the pre-test, matching the assumption that if students were not familiar with an EBP concept, their confidence in using that concept would also be low. Students reported greater familiarity with and confidence in all aspects of the EBP process, including forming clinical questions and literature searching skills, following completion of the EBTM assignments. Similar to our results, Thom[22] found that medical residents' confidence in the skills of clinical questioning through the PICO format and critical appraisal of literature, were increased after residency rotation. Additionally, Wanvarie[2] demonstrated increased confidence in formulating clinical questions and appraising literature following longitudinal instruction within a curriculum.

Common patterns emerged as a result of the question regarding how students intended to use the EBP process beyond EBTM educational sessions. More specifically, students identified their intention to use EBP skills and knowledge in graduate school, if a treatment was not working, with chronic injuries, and during discussions with peers or ACI/CIs. While our findings regarding future use are in agreement with other investigators,[22] most other studies do not identify specific examples of when students might find EBP beneficial to use. The addition of open-ended questions to the EBCKAU survey allowed students to express their own personal intentions for EBP use, rather than trying to "fit" their answers into more structured questions.

Barriers to EBP

Previous studies have identified several barriers to use of the EBP process.[25-29] Similar to our findings, these barriers include time, relevance of the literature to target population, available resources, ACI/CI open-mindedness, and agreement with class information. Identification of these barriers is important to the transition toward inclusion of EBP concepts in professional education. Educators and clinicians should understand these barriers, identify potential implications on instruction, and act proactively to overcome them. Specific strategies for surmounting these barriers should be embraced by ATEP faculty and ACI/CI's through goal setting and alignment with the current edition of Athletic Training Education Competencies' requirements.[30]

For example, athletic training students responded that they felt that what was taught in the classroom was not supported by what they observed in the clinical setting. While this problem cannot immediately be remedied, fostering an educational environment that is open to obtaining and incorporating evidence in practice[8] could serve as a starting point. Cohesion of didactic information and clinical application could be enhanced by establishing evidence-based expectations among all parties associated with the ATEP, thus fostering a change in attitudes and behavior toward evidence.[31] Creating interactive opportunities, such as programmatic planning meetings, ACI training sessions, in-services, and continuing education topics[29] that will promote infusion and use of EBP, could be beneficial to establishing this environment. To solidify the evidence-based environment, educators and clinicians could then make the use of evidence visible to students, both during instruction and patient care.

Another barrier provided by students was the lack of available and applicable resources to support their clinical questions. One suggestion to ease this barrier could be to expand the amount of scholarly activity within areas that relate to outcomes that have clinical and patient perspectives that can be used to examine patient care.[30] We must examine the information that is readily available to and documented by clinicians in order to change care within our traditional settings. Additionally, continuing education opportunities that address this area should be available for promotion of this practice-based research network. Modeling of best practices by clinicians providing clinical instruction could help students to see evidence as a valued part of patient care as they learn to use judgment when integrating evidence into clinical decisions.[6,20]

The barriers identified in our study, combined with our suggestions for progression toward overcoming these barriers, are in alignment with recommendations of physical therapy literature as well.[32] Physical therapy embraces collaboration of academic and clinical faculties in efforts to approach EBP throughout student education. With a unified vision aimed at promoting EBP behaviors in the clinical setting, curricular designs of physical therapy professional programs have transitioned to emphasize EBP skills, knowledge, attitudes, and behaviors, while providing practicing physical therapists with opportunities to model this behavior to students.[20]

Limitations

Limitations to our study exist primarily in threats to internal validity, including the stratified purposeful sampling method used. An additional concern for the sample is the self-report nature of the EBCKAU survey. It is possible that student responses were based upon what they felt was the "socially desirable" answer to survey questions rather than their true knowledge or attitudes. A limitation may also be identified in the content of the EBCKAU survey, as it was designed to assess foundational components of EBP knowledge, specifically the process of EBP, and does not assess higher levels of EBP knowledge. We also did not assess the amount of EBP concept exposure students had within each ATEP prior to the intervention. However, the high response rate (95% knowledge, 83% attitudes/use) increases the external validity of our study. Additionally, the inclusion of the EBTM as a two-day session in a semester long course is only representative of a small component of these classes. Therefore, the results are only applicable to those classes.

Clinical Relevance

Despite these limitations, our study provides a unique approach to evaluating a teaching model related to EBP. When analyzing

teaching strategies of other health professions, it is evident that few analyzed pre/post-quantitative results. Most publications present the strategy itself with qualitative results.[14, 33, 34] Prior studies have focused on displaying enabling factors for student understanding of EBP, student perspectives on the teaching strategy, or faculty perceptions of the model. Therefore, our study and the EBCKAU are unique in that we assessed multiple aspects of the EBTM that most other research has not yet evaluated. Unlike other teaching strategies, the EBTM was implemented in multiple institutions of varying size from several NATA districts, in courses that already were in existence, while most other strategies were implemented in individual programs or workshops. Also, the EBCKAU survey assessed knowledge, attitudes, use, and barriers through various types of quantitative and qualitative questions, thus determining a broader scope of influence of the EBTM.

CONCLUSION

Our EBTM curriculum, based on a 2-day interactive didactic lecture format combined with clinically-integrated activities, appears to improve athletic training students' knowledge and confidence. Such EBP teaching structures have been recommended to maximize knowledge, skills, and attitudes among students.[12, 13] A primary aim of the EBTM was to provide a method for inclusion of EBP concepts in athletic training education that would promote critical thinking in students.[7]

Based on our results, lower levels of knowledge, confidence in knowledge, and familiarity increased. However, interest and importance did not increase, and commonly reported barriers related to time, resources, ACI/CI open mindedness, and agreement with class information were noted. Specific strategies for surmounting these barriers should be embraced by ATEP faculty to prepare students and clinical instructors for the forthcoming edition of the Athletic Training Education Competencies which include EBP concepts. Lastly, since each of the attitudes and confidence in use variables showed no relationship to GPA, instructor teaching experience, or semesters accepted in an ATEP, it is unknown how these factors might influence EBP competency implementation.

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APPENDIX 1. EBCKAU Survey

Knowledge Evaluation: Please answer the following questions in the left column, and rate your confidence in that answer with the scale in the right column. For the confidence questions, circle the answer that best completes this sentence regarding the corresponding question on the left: *I am _____ confident that I answered this question correctly.*

QUESTION	Confidence Scale			
1. The first step in evidence based practice is to A. Search for research literature B. Critically appraise the current research C. Define a clinical question D. Choose a research database	Not at all	Mildly	Moderately	Extremely
2. When defining a clinical question using the PICO technique, which factor should you consider first? A. Return to play criteria B. Patient goals C. Patient age D. Personal experience	Not at all	Mildly	Moderately	Extremely
3. When conducting a literature search, which of the following on-line sources holds the highest quality content? A. Google Scholar B. Medline C. Cochrane Database D. WebMD	Not at all	Mildly	Moderately	Extremely
4. Which type of research design is considered to have the highest quality of evidence? A. Randomized control trial B. Independent laboratory investigation C. Case study D. Single subject design	Not at all	Mildly	Moderately	Extremely
5. An athletic trainer's personal experience with ultrasound should primarily be used to A. Develop expertise that can be passed on to students B. Guide future clinical practice and decision making C. Provide solid evidence in support of ultrasound D. Create standard treatment protocols for all patients	Not at all	Mildly	Moderately	Extremely
6. When assessing the outcome of a treatment you used what factor would most likely lead you to use it again? A. Patient satisfaction with the outcome B. Outcome agreement with current literature C. Short length of treatment time to achieve outcome D. Outcome achieved consistent with selected goals	Not at all	Mildly	Moderately	Extremely
7. Please list below the steps of the PICO process of developing a clinical question.	Not at all	Mildly	Moderately	Extremely

The remaining questions do NOT require you to complete a confidence scale.

8. When conducting an on-line literature search, list below which sources you personally utilize and rank your preference in using those sources (1 = most preferred, 5 = least preferred).

9. Which factors should be considered when appraising literature for potential use as a treatment option for a patient? (Check all that apply)

___ Results of the study ___ Validity of the study ___ Subject characteristics
___ Year of the study ___ Length of abstract ___ Journal of publication
___ Number of authors ___ References listed ___ Location of the study
___ Applicability to patient

10. Which of the following items do you use greater than 2 times per week when studying? (Check all that apply)

___ Course notes ___ Creating a Clinical Question ___ Textbooks
___ Journal Articles ___ PICO Process ___ Websites
___ Peer-Reviewed Research ___ Classmate Conversation ___Library Databases
___ Discussion with ACI ___ Previous Experience
___ Appraisal of Research ___ Athlete Suggestions

11. Which of the following items do you use greater than 2 times per week when ***determining treatments for patients?***

___ Course notes ___ Creating a Clinical Question ___ Journal Articles
___ PICO Process ___ Textbooks ___ Peer-Reviewed Research
___ Classmate Conversation ___ Websites ___ Discussion with ACI
___ Previous Experience ___ Library Databases ___ Appraisal of Research
___ Athlete Suggestions

12. Describe below any barriers you may/will have for using evidence-based practice concepts in athletic training.

13. Describe below ways in which you envision yourself using evidence-based practice skills in your future work as an athletic training professional.

Attitude and Use Evaluation

The following questions pertain to your *familiarity, confidence, interest, and perceived importance* of evidence based practice concepts. For each of the four sections, please check one box that best describes your answer. A sample has been provided.

SAMPLE	**Section 1** **To what extent are you *familiar* with this concept?**				**Section 2** **How *confident* are you in your ability to use this concept?**				**Section 3** **How *interested* are you in using this concept?**				**Section 4** **How *important* is this concept to you?**			
Concept	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very
SAMPLE: Evaluating a lateral ankle Sprain			X				X					X				X

Please answer these questions from the perspective of an athletic training student.

	Section 1 **To what extent are you *familiar* with this concept?**				**Section 2** **How *confident* are you in your ability to use this concept?**				**Section 3** **How *interested* are you in using this concept?**				**Section 4** **How *important* is this concept to you?**			
Concept	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very	Not at all	Limited	Some-what	Exten-sively	Not at all	Limited	Some-what	Very
Creating a clinical question																
Searching literature for information to support clinical decisions																
Critical appraisal of literature																
Accessing clinical expertise from your clinical instructor																
Improving patient outcomes using evidence-based processes																