

A Conceptual Framework for Clinical Education in Athletic Training

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Objective: To develop a model for clinical education in athletic training education based on integration of various allied health professional clinical education models.

Background: Clinical education is a critical component of allied health education programs. It allows for the transfer of knowledge and skills from classroom to practical application. Clinical education needs to be structured. In addition the Clinical Instructor (CI) also needs to facilitate athletic training students' development into effective, evidence-based practitioners.

Description: A brief discussion on the need for transfer of knowledge in athletic training education is discussed. A review of the various clinical education models from allied

health professional education is presented. Finally, a model for athletic training clinical education is presented with implications for practice.

Clinical Advantages: As athletic training education continues to develop, a need to formalize clinical education and develop a clinical education model for athletic training is warranted. Focusing on the structure and function of clinical education will continue to move athletic training education forward and will align athletic training education with other allied health professional education programs.

Key Words: Transfer of Knowledge, Critical Thinking, Student Development

Clinical education is defined as the “practice of assisting a student to acquire the required knowledge, skills, and attitudes in practice settings to meet the standards as defined by a professional accrediting board.”¹ There are five goals of clinical education: authenticating student knowledge; interpreting theoretical and applied knowledge; developing and refining skills; familiarizing students with the workplace; and developing problem-solving and time management skills.² Clinical education is the bridge between higher education and the reality of the workplace.³

The National Athletic Trainers' Association Education Council (NATA Education Council) developed educational standards with specific competencies, proficiencies, and skills that each athletic training student must know before graduating from an accredited athletic training program. The NATA Education Council has continued to reform and improve athletic training educational programs, especially in its focus on learning over time. Research in educational psychology consistently demonstrates that long term

retention and knowledge transfer into the real world context is truly only accomplished by obtaining knowledge over time.⁴

The next step in aligning athletic training education to other allied health professions, such as nursing, medicine, and physical therapy, is shifting our mind set to focus on the athletic training student as a learner. Developing athletic training students into effective practitioners should be a priority. Athletic training education has traditionally focused on skill development and proficiency of skills, creating skilled “technicians” in the field of athletic training. Although proficiency of skills is warranted, it can be asked if the application of skills and knowledge into a real world setting has occurred. Athletic training education to date has been so focused on skill forms and check lists that it has neglected fostering environments that develop critical-thinking skills and decision-making skills. Athletic training students need to be able to transfer explicit knowledge obtained in the classroom, into a real world context. Clinical education is the environment created to foster the application of knowledge. In evidence-based practice the application of knowledge is what separates an undergraduate education from technical skill training.

The most recent athletic training educational competencies⁵ have begun to move toward a more holistic approach of proficiency. The NATA Education Council has developed clinical proficiencies that are much more inclusive in nature and facilitate critical thinking and problem solving in the clinical setting. They are moving in a direction that will facilitate better practitioners through the use of more holistic scenarios. As educators, we need to begin to embrace this move toward inclusive problem solving and critical thinking and move away from developing skill-based technicians. Finally, athletic training education programs need to develop



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practitioners, who listen carefully to themselves and others and reflect on their own practice to make improvements for the future.

Current literature in the area of clinical education for athletic training focuses on two areas: the clinical instructors themselves and the clinical settings. The literature to date has fallen short on the development of the student as a learner within the clinical setting.⁶⁻

¹¹ In addition to the acquisition of knowledge, colleges and universities exist to facilitate the transfer of knowledge.⁴ There is an underlying assumption in formalized education that the knowledge, skills, and personal attributes learned in this setting will be recalled and applied in the appropriate context. This ability for our students to apply knowledge should be the focus of any allied health professional program.¹²

The purpose of this paper is to develop a model for athletic training clinical education that will improve learning and promote transfer of knowledge from the didactic classroom to the real world setting. The focus of this model will be on the development of the student as a learner and professional. This model will go beyond the development of specific skills to create a learner that can use applied knowledge in evidence-based practice. A review of transfer of knowledge literature and a review of a variety of existing clinical education models will be presented from various allied health professions as a precursor to the development of an athletic training clinical education model.

Transfer of Knowledge

There are specific strategies and techniques that can be implemented in a clinical education program to facilitate the transfer of knowledge. Transfer of knowledge is a growing area of literature that promotes knowledge application from the classroom into the real world context.¹³ Nursing education, among others, has begun to utilize transfer of knowledge in their training of best practices.¹⁴⁻¹⁵ These learning strategies are dependent upon the dependability and reliability of the experimental situation and the relation of the material originally learned to the context of the situation.¹⁶ Transferring knowledge, then, is completely dependent upon the clinical education scenarios to which athletic training students are exposed. Students must become acculturated in clinical education settings, learning not only how to transfer knowledge but also learning to adapt and adopt professional behaviors within that setting.¹⁷

The first step to fostering the transfer of knowledge begins in the classroom. Although true transfer of knowledge must occur in the clinical setting, it must first be introduced as a concept in the classroom.¹⁶ Scenarios and simulations in a controlled environment can be introduced in the classroom with dialogue throughout, discussing the real life implications. For example, first year students may be introduced to the various modalities that are available and in which situations they would use those modalities. As a first year student, these individuals cannot even apply the modality, nor can they understand the chemical and scientific principles behind the modality application, but they can begin to understand that, in certain situations, certain modalities are applied. A simulation model with varying injury scenarios can be used to facilitate the application of this concept without actually being in the clinical setting. It is also critical during these types of activities to reflect on the potential for the knowledge to transfer into practice. This creates a mind set of application of knowledge and the ability to reflect on practice.

The second step in transfer of knowledge is actual application of knowledge within real world experiences. This is the “learn-by-doing” application that requires exposure to authentic problems in the clinical setting.¹⁶ Simply exposing our students to these scenarios and having them observing is not enough. Students must approach problems and scenarios independently with some reassurance from their clinical instructors. Students need to develop confidence in their clinical and decision-making skills.³ A lack of confidence often is driven by fear and apprehension, limiting student development in the clinical setting. This fear and apprehension should be addressed in the traditional classroom through the implementation of simulations, case study analysis, learning communities, and problem-solving activities. They must begin to practice what they have learned in order to be able to transfer their knowledge base into the real world. Asking a student to select the appropriate modality and specific protocol for an injury could be a simple way to utilize a student’s knowledge base and to increase their knowledge retention by promoting the transfer of knowledge.

Also critical in this context is what has been referred to as “reflective practice.”¹⁸ It is not enough to apply the knowledge, there needs to be reflection attached to the experience, which promotes students’ retention of knowledge. Reflective journaling allows learners to make connections between themselves, the faculty, and their clinical setting.¹⁸ In addition, reflective journaling encourages critical thinking by making connections between the current context and previously learned knowledge.^{18,19} Using Smith’s Learning to Learn model²⁰ in improving student development, reflective journaling would be a first step into becoming more aware of oneself as a learner. It is critical in these reflections to make connections. Students should think about where they learned the information necessary to manage the situation. They should think about what they actively did and what they may change in the future. Students should be making some connections about how they can use what they have just learned in this situation. Finally, they should reflect on their own learning and how they are developing as an active and assertive learner. Specifically, what learning strategies they used in this situation, how they have developed as a learner and practitioner, and how this will affect their learning in the future.²⁰ Situated learning is a construct in higher education where simulated experiences resemble situations individuals will face in the work place. Clinical education facilitates situated learning. It is critical to put students into complex social contexts in order to fully learn and understand what they will be faced with at the workplace.¹⁶ This facilitates a situation in which students are not only learning content and the application of that content, but also the context of the workplace. Athletic training students should be exposed to a wide variety of clinical education settings, including physical therapy clinics, colleges and universities, and high schools, because professional practices vary in these settings. Students need to learn to adapt to these variations in order to be successful in the work force. These scenarios require significant cultural support and guidance from the clinical instructor. This guidance and support builds trust. These complex clinical settings are also wonderful opportunities to facilitate “communities of practice,” or a collaboration of students working together to enhance their acquisition of knowledge and skills.¹⁷ Taking the time to discuss learning experiences in a group is a great way to debrief and learn from peers.

Clinical Education Models

There have been a number of clinical education models developed in allied health fields, including nursing, physical therapy, speech pathology, audiology, and medicine.^{2, 21-24} Goldhammer, Anderson, and Krajewski²² were among the first to develop a model for formalizing clinical education. There was a movement in the 1980's away from passive observation toward more direct engagement in the development of clinical skills.¹ They developed a model that incorporated a pre-observation meeting, educator observations, educator feedback, and both self and educator analysis with plans for modification. This model focused on the role of the educator and the importance of a good working relationship between the educator and the student. This relationship is still analyzed and supported today in the literature.^{6, 14, 25-28} However, this model seemed focused on the engagement of the student and never addressed student learning.

Mandy Model of Clinical Education

The Mandy Model²⁴ was an expression of the Goldhammer, Anderson, and Krawejski model.²² It was originally designed for speech pathology students' clinical field experiences. Mandy's Model²⁴ contains five steps a student should go through when engaging in clinical education: pre-observation, observation, analysis and strategy building, reflection on action, and then reflection for future action. Mandy suggests students initially meet with their clinical instructor to review the intended process. During this time they should discuss the specific clinical education model in use, as well as the goals of the clinical experience. Negotiating what the student hopes to gain from the clinical experience is appropriate. Students and their clinical instructors can develop plans, or a "contract" that is tailored to the individual needs of the learner. Next, the clinical instructor works directly with the student in the clinical setting and facilitates experiences specific to the student's learning needs. The clinical instructor observes the students' activities and progress while providing timely feedback. In addition, the clinical instructors ask thought-provoking questions of students while actually engaged in clinical activities. This provides an opportunity for "reflection in action."²⁹ Finally, clinical instructors should be recording the observations to later show to the student. The feedback should be constructive and timely to ensure students make their own connections and will improve their practice. The clinical instructor's responses should occur relatively soon after the observation so the student's actions can be easily recalled. In addition, the feedback should be content and context specific, aiding in the development of the student's clinical skills.

The third stage of Mandy's clinical education model²⁴ is the analysis and strategy phase. This is when the student and the clinical instructor sit down for the purpose of continuing to develop the student's specific skills. Mandy²⁴ suggests special attention should be paid to the relationship between the clinical instructor and student. It should have equal input from each party and not be a one-sided conversation dominated by the educator. Mandy also suggests students and their instructors develop mutually agreed upon topics for discussion and evaluation that includes a plan to seek out the necessary resources.

The fourth and fifth stages of the Mandy model of clinical education²⁴ include reflection. First, students recall experiences and make judgments regarding their own practices in their clinical education. Schon²⁹ refers to this process as reflection on action;

students are encouraged to be self-reflective during this stage of their learning in clinical education. Journaling may be one effective form of reflection in this stage. While the clinicians are encouraged to be involved, they should be warned not to pass judgment on the student. They can assist in the evaluation and provide suggestions while nurturing the student's development.

Finally, the clinical instructor asks the student to reflect on their own skill development as a way to improve their future practice. This should be in the form of a self-evaluation that requires students to make future connections. Instructors should ask how they would change things in the future. This self evaluation should include three components: what they have learned; how it has impacted their skill attainment; and how they plan on practicing in the future based on what they learned.

This five-step model could be implemented during each semester of the student's career. Experiences can become more autonomous as the student develops. In addition, the clinical practice should relate to what is current and relevant in their current didactic courses. In order to ensure the student will retain this information, they must make connections both within and outside of the classroom. Mandy²⁴ identifies a need for a deeper understanding of the content, in order to be able to apply it in different contexts. In addition, they should be able to integrate newly learned information with previous knowledge. This deep understanding of knowledge and skills is central to transfer of learning.³⁰

Cox Model of Clinical Education

The Cox model of clinical education³¹ has two components: experience and explanation, and is geared toward the development of self direction in medical students. The experience component, also referred to as the experience cycle, occurs when the student is engaged in clinical hands-on education. The explanation cycle occurs when the student is reflecting on their clinical education experiences.

The Cox model begins with previous knowledge. Cox³¹ believes it is critical to lay down the foundational knowledge prior to clinical experiences, otherwise a sense of worthlessness and confusion will conflict the student. This is true for most allied health education programs in which most course work is completed prior to clinical education experience. From the prior knowledge and preparation, the student then enters the experience cycle. This begins with a meeting regarding the roles and expectations of the clinical experience, prior to an actual clinical encounter. Immediately following the encounter is a period of debriefing, which is designed to question the student and clear up misconceptions.

Following the initial debriefing, the student enters the explanation cycle, which begins with a period of reflection. Ideally students judge their own actions and make recommendations for the future. Next, the student is asked to explain to others what they have learned. Learning communities can be formed where students come together on a regular basis for the purpose of sharing their experiences with the other students. This allows students to develop a working knowledge of the topic or skill. They have been able to reflect both individually and in a peer group and can now take specific knowledge away from the experience to change their practice in the future. They now have previous knowledge and experience that they can build upon.

The ultimate goal of the Cox's model is self-direction. Cox³¹ believes clinical instructors should design experiences that are closely supervised, but eventually become more autonomous. Clinical instructors encourage students to independently seek out answers to become more resourceful. The clinical educators can have upper level students who are more autonomous serve as models for the lower level students, teaching them both clinical and self-directedness skills. Ultimately, clinical education should become "self clinical education" (p. 572).³¹ A self-directed learner takes ultimate control of their own learning. The clinical instructor should allow for more autonomy and clinical practice for these self-directed students, providing supervision and direct feedback when needed.

Burnard Model of Clinical Education

Burnard²¹ developed a model of clinical education that focused on the development of the learner. While he also develops the relationship between the clinical instructor and the student, his model includes self-assessment and self-negotiation, facilitating personalized growth through individualized critique. Burnard²¹ believes it is critical for individuals to develop into reflective practitioners who examine their own practice and make changes to improve upon it; thus making practitioners more confident, competent, and sensitive to the needs of their patients.

Burnard's²¹ model focuses on self as the learner with the clinical instructor acting only as a guide or resource. Athletic training students should be encouraged to seek out learning opportunities in their clinical education that are meaningful and beneficial to their professional growth and development. These learning opportunities may include finding answers to questions that have arisen during the clinical experiences. It may also include developing a rehabilitation protocol and following through with the athlete until they return to play. Finally, athletic training students should be encouraged to pursue relevant internships and apprenticeships outside of the requirements of the athletic training program.

Burnard²¹ believes focusing on the self will facilitate self-regulation and, in turn, self-directed learning. Self-direction within clinical education would mean the learner moves from a period of strict dependence on their clinical instructor to one that can make autonomous decisions with the impartial supervision of the clinical instructor. Burnard believes the thoughts and feelings of the learner will drive behavior. By facilitating a strong, independent self, and a focus on the self as a learner, individuals become more self-directed. Through a comprehensive review of clinical education, it appears self-directed learning is an intricate component necessary to facilitate effective learning in informal learning environments.^{1, 21, 32-34}

Clinical Education Framework for Athletic Training

Based on a review of allied health clinical education models, a framework for clinical education in athletic training is presented (Figure 1). The conceptual model consists of six steps with a variety of variables that may influence each step. The steps include selecting appropriate clinical instructors, training, a meeting between the clinical instructor and the athletic training student with goal setting, clinical experiences, reflection, and finally, debriefing. In addition, subsequent meetings between the clinical instructor and

the student may be set to readdress previously developed goals and objectives. This model could be implemented in each clinical experience throughout a student's academic career.

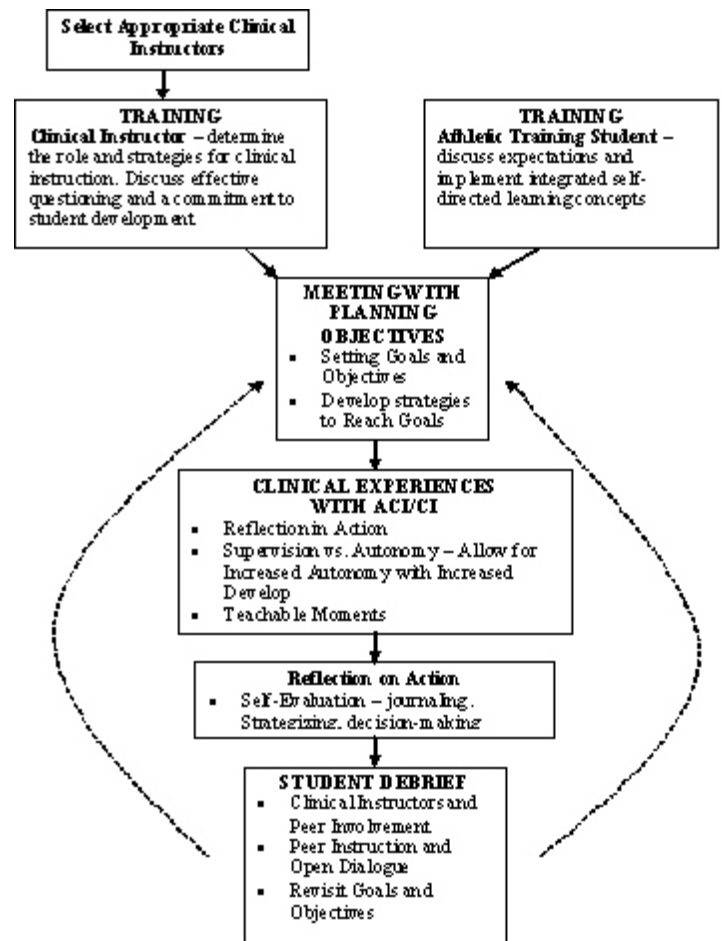


Figure 1. A Framework for Athletic Training Clinical Education

The selection of appropriate clinical instructors is the first step to ensuring an effective clinical education program. Selecting clinical instructors is based on six dimensions.¹ The first dimension includes the clinical instructor having a sense of self-awareness, self-identity, and having a certain level of control. Second, the clinical instructor should value the relationships they have with others. They should primarily be people-centered. Third, the clinical instructor should have a strong sense of being a clinical instructor. That is, the individual is highly motivated to educate and has a strong commitment to advance the student as a learner in athletic training. The fourth dimension is having a commitment to learning to be a clinical educator. This includes maintaining an effective learning environment, managing student learning, and making learning and development a high priority in their busy schedules. Fifth, the clinical instructor should seek self-congruence.¹ This means the clinical instructor has consistency between who they want to be and who they are as a person in their profession. They have a strong sense of self and carry that with them both at work

and away from work. Finally, the clinical educator needs to be committed to growth and professional development. If the individual satisfies these criteria, a training session is designed to improve their clinical instruction skills.

Clinical instructor training is critical to the success of this athletic training clinical education model. There must be mandatory training sessions for clinical instructors to ensure proper clinical education is occurring. The NATA Education Council already mandates clinical instructor training. These training sessions are great opportunities for learning effective clinical instruction and evaluation techniques.

There are four clear roles of all clinical educators.¹ The roles are presenting, questioning, problem solving, and conferencing.¹ Presenting is especially important with novice students. Clinical instructors should model and explain skills and professional behaviors. The second role is questioning, a critical component throughout the entire clinical experience. Clinical instructors must learn to effectively question prior to, during, and after a student has performed a clinical skill to ensure effective learning and retention. Effective questioning can also facilitate critical thinking.³³ A commitment to clinical instruction by clinical instructors will lead to effective questioning, utilizing teachable moments, and stimulating metacognition. The third role is problem solving, or what is also referred to as guided instruction.³⁵ Clinical educators can model and facilitate effective problem solving with the students to ensure their resourcefulness and give them confidence in future decisions. The final role of the clinical instructor is conferencing. This includes having both formal and informal meetings with the students to discuss any number of items, including knowledge retention and application.

There are five strategies every clinical instructor should have in order to promote student's critical thinking³³ (Table 1). The first strategy is questioning, or more specifically higher-order cognitive questioning. This includes in-depth probing and asking students "why" to lead them to the construction of new knowledge. The second strategy is debriefing, which is included in the current model being presented. Debriefing can happen at the end of the day, at a practice, during a class, and is recommended to be done in a group. This stimulates peer sharing with the clinical instructor as the facilitator, and is designed to engage students in reflective problem-solving. The third strategy is journaling, another reflective piece that students should be performing in their clinical education experiences. This is not merely tracking events, but having students see the meaning of their clinical experiences. O'Connor³³ provides a comprehensive list of possible discussion points for the journals that can promote deeper meaning. The fourth strategy every clinical instructor should use to ensure critical thinking is process recording. The clinical instructors themselves complete the process recordings. They observe the interaction between the patient and the student and then interpret what is going on in a non-judgmental fashion. The clinical instructors then provide the student with this feedback and encourage them to draw some inferences on their clinical practices. The final strategy clinical instructors should employ is facilitation of student self-evaluation. Each student should self-evaluate their decision making skills, their self-direction, and their resourcefulness.

Table 1. Clinical Instructor Strategies to Promote Critical Thinking in Students

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| Effective Questioning | In-depth probing for deeper meaning, asking students "why," having students explain clinical decisions |
| Debriefing Regularly | Clinical instructor and student share experiences and observations, engage in reflective problem-solving; may be done individually or in peer groups |
| Student Journaling | Have student reflect on their experiences to derive meaning and make decisions regarding future practice based on current actions |
| Process Recording | Clinical instructor records observations between student and patient, interprets interactions, discusses observations with student, makes recommendations |
| Facilitate Student Self-evaluations | Students self-evaluate on decision-making, self-direction, and resourcefulness. Clinical instructors provide constructive feedback |

In addition to clinical instructors' training, the students must receive training regarding their clinical instruction. In this training, students will first be asked about what they hope to accomplish from their clinical education experience. These goals should be very specific to that particular semester and a discussion should follow regarding the value of clinical education in allowing students to transfer and apply their previously learned knowledge. This goal setting promotes self-direction, especially if the clinical instructor is enthusiastic and supportive of these goals. In addition, the facilitator must stress reflection on action for personal and professional growth. The clinical instructor can provide students with the framework for reflection on action and should stress the

value of self-reflection on future decisions. For example, a student may be asked to select a modality and apply it to a patient based on their injury and current pathology. After the application, the clinical instructor can probe the student for deeper understanding into their decision-making process and ask them to reflect upon their decisions and the implications for future practice. Finally, an emphasis on self-direction and engagement in learning should be stressed.

The third step in the model is a meeting between the clinical instructor and the student. This step was also present in both Mandy's²⁴ and Cox's³¹ models. This meeting should be one-on-one and should focus on the goals of the student and the respective roles

of student and clinical instructor. This relationship should establish itself as a partnership with mutual respect and values. This partnership is an ideal relationship for learning in the clinical setting.³⁴ It allows for students' voices to be valued and creates a safe environment in which students become much more engaged. In addition, the student should share their previous knowledge and experiences with the clinical educator to better plan for instruction and self-directed learning projects. In addition, Mandy²⁴ expressed that negotiation is possible in this meeting and the two individuals should jointly make decisions regarding clinical education for the upcoming semester. This will vary depending upon what stage of self-direction the learner is in.

The next step makes up the bulk of the benefit from the clinical experience. This is the actual engagement of the student in the clinical experience. These should be directly supervised if the student is a novice and more self-directed and autonomous if an upper level student. Each student should fit on this continuum and should dictate how much direct supervision and instruction they need based on their own self-direction. The clinical instructor plays a critical role by demonstrating the relevance of the learning experience and engaging in reflection in action. The clinical instructor should use higher-order cognitive questioning to promote retention and improve practice.³³

Following the actual clinical learning experience is a time for reflection. This includes journaling, strategizing, and making decisions regarding future practice. Students should reflect upon their decision making process as well as the decisions themselves. They can reflect on what they would have done differently and how it will impact them in the future. In addition, they can identify what previous knowledge aided them in this particular situation. This would include the student listing the resources utilized during the experience or scenario. O'Connor³³ provides eight possible discussion points for this type of reflection. The discussion points include: describe your clinical practices, describe your decision-making process, describe what you would have done differently in a similar situation, describe the clinical situation in relationship to its parts and a whole, identify previously learned knowledge and skills that helped you in this situation, where do you view your competence, describe your strengths and weaknesses, and finally, describe the resources you identified and utilized.

Finally, the model would include a regular debriefing that includes the student, the clinical instructor, and peers. The debriefing would be encouraged in the clinical setting as an informal practice. This is something that can occur at the end of the day or while sitting at a practice or an event. During the weekly meetings, these discussions will be more formal with opportunities for peer instruction and open dialogue to improve practice. This debriefing session will include a review of the original goals and objectives established for that clinical education experience and may lend itself to making some revisions or changes to these goals and objectives.

RECOMMENDATIONS

Additional research needs to be conducted investigating clinical education models in athletic training education. The model presented in this article was derived from an extensive review of the literature, but has not been evaluated for its effectiveness. As athletic training education continues to evolve and improve, there needs to be a continuation of research, writing, and speaking on the

topic of clinical education and its vital role in the development of athletic training students into effective, evidence-based practitioners.

Conclusion

The purpose of this article was to review various clinical education models and to integrate these models in an attempt to develop a framework for athletic training clinical education. Clinical education should have five goals: authenticating student knowledge, interpreting theoretical and applied knowledge, developing and refining skills, familiarizing students with the workplace, and developing problem-solving and time management skills.² At the heart of these goals is transfer of knowledge from the didactic course work and apply it in the clinical setting. This transfer is what facilitates the development of the athletic training student's problem-solving and metacognitive skills.

The education council has made a commitment to improving clinical education through the elimination of an hour requirement and the expression of clinical exposures and experiences. Athletic training educators and administrators must continue to take an active role in developing and formalizing the clinical education experiences. This commitment toward the improvement of clinical education, such as developing a model to guide the practice of clinical education, is what will continue to improve the professional practice of our graduates.

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