

Historical Perspective of Athletic Training Clinical Education

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Abstract:

Objective: To present a historical perspective of the development and evolution of clinical education in the medical and allied health professions, with a special interest in athletic training; to gain a better understanding and appreciation of the depth and breadth of the structured and formal clinical education needed in athletic training, for both the present and the future.

Data Sources: Information was drawn from the Educational Resources Information Center (1966–2001), MEDLINE (1966–2001), SPORT Discus (1830–2002), and CINAHL (1982–2002) searches of historical literature relating to the development of medical, allied health, and athletic training clinical education. Key words searched were *clinical education, clinical instruction, medical education, allied health education, history of medical education, athletic training education, and history of clerkships*. We also used reference materials cited in historical textbooks on medical education.

Data Synthesis: Clinical education in American medical schools evolved from a primarily didactic process to the clinical-clerkship model. In contrast, athletic training professional preparation was initially more steeped in clinical experiences and less in didactic instruction.

Conclusions/Recommendations: Reviewing medical education over the past century and allied health clinical education over the past 30 years provides interesting insights about the past, present, and future of athletic training professional preparation. Athletic training clinical education is undergoing reform and development, which will subsequently enhance the profession. Athletic training has entered an exciting era in its history.

Keywords: athletic training education, clinical instruction, allied health education

Article:

Athletic training clinical education can be described as the portion of the athletic training student's professional preparation that involves the formal acquisition, practice, and evaluation of clinical proficiencies through classroom, laboratory, and clinical experiences in medical care environments.¹ Clinical education in the health professions could be viewed as a triad involving the interplay of setting, instructor, and student. With little time spent in observation, clinical education is the portion of the curriculum in which the theoretic and practical educational components are integrated into real-life situations with actual athletes or patients.² Few limitations are placed on which activities constitute clinical education. The hands-on activities can include any experience that provides a practical or applied focus. For instance, students might practice their psychomotor skills in a simulated environment on simulated patients. Clinical education progresses from general technical skills to clinical competence, and students must learn to appreciate the affective aspects of their profession's distinctive working environment and develop necessary interpersonal and social skills and attitudes.³

Clinical education constitutes a substantial portion of professional preparation in the allied health care fields. Entry-level certified athletic trainers perceive that approximately 53% of their entry-level professional development came from clinical education.⁴ In physical therapy, clinical education has been reported to be approximately 23% to 30% of the total curriculum.⁵ Given the importance of clinical education, an awareness of and appreciation for the background, history, and future directions of clinical education is valuable to clinicians and educators alike. Much can be gleaned from the development and maturation of clinical education in

medicine and other health care fields; from this background, a current perspective of athletic training clinical education can then be more easily understood and appreciated. Further, this perspective can heighten our attention and focus to more adeptly shape athletic training clinical education in the future. In this review, we present the historical developments of clinical education, specifically athletic training clinical education. We also discuss recent trends and future directions in allied health professions and athletic training clinical education.

Data Sources

We identified information from the Educational Resources Information Center (1966–2001), MEDLINE (1966–2001), SPORT Discus (1830–2002), and CINAHL (1982–2002) searches of historical literature relating to the development of medical, allied health, and athletic training clinical education. Literature searches were guided using the following key terms: *clinical education*, *clinical instruction*, *medical education*, *allied health education*, *history of medical education*, *athletic training education*, and *history of clerkships*. We also used reference materials cited in historical textbooks on medical education.

Historical Development of Clinical Education

Allied health care professions such as athletic training, physical therapy, and nursing have clinical education as part of their curricula.⁶ Clinical practice has always been at the heart of a student's educational experiences and is of vital importance in the transformation from novice to competent practitioner. Consequently, competency-based education has emerged as the central focus in clinical instruction in the health professions.⁷

Historically, clinical education in the allied health professions has evolved from the medical-education paradigm for training physicians. Most notably, clinical education is derived through training apprenticeships in which an aspiring student learns many facets of the profession from the “master.” Pioneer medical educator Dr William Osler⁸ wrote, “by what may be called the natural method of teaching, the student begins with the patient, continues with the patient, and ends his studies with the patient, using books and lectures as tools, as means to an end.” This basic concept has guided clinical education in the medical profession over the past century. Medical students still begin to acquire clinical skills at the patient's side, usually in a hospital or outpatient-based clinical affiliation. This approach has been accepted by medical educators as an effective means of teaching clinical medicine.⁹

The evolution of medical clinical education from the apprenticeship model to the competency-based instruction and evaluation model, however, was a precarious one. Clinical instructors and clinical-education settings, 2 elements of the clinical-education triad, presented difficulties. As early as the mid 19th century, medical educators reported a lack of uniformity among clinical instructors or preceptors (clinicians who provide clinical experiences and instruction for a student).¹⁰ Certainly this situation gives strong justification for the Approved Clinical Instructor requirement we discuss later. A subcommittee report on the “uniform and elevated standards or requirements” given at the National Medical Convention in 1847 placed a good part of the blame on the preceptorial system.¹⁰ The subcommittee decided that the chief responsibility for training young doctors must rest with the preceptors; they were the ones who encouraged students to enter the profession and provided the early medical training.¹⁰ The subcommittee felt that the preceptor must determine and certify the quality of the preliminary education of his students. As early as the mid 1800s, then, it was felt that only through work with preceptors and study in hospitals could medical students acquire the knowledge and experience necessary for successful practice.¹⁰

In the generation before 1910, didactic and clinical medical education in America had not developed evenly.¹¹ Clearly, by 1910, the strength of the country's medical schools had come to lie in the basic science instruction of the first 2 years.¹¹ Equivalent progress in clinical instruction had not occurred. Although the academic courses provided students the latest knowledge, instruction remained predominantly didactic, with limited clinical opportunities.¹¹ After the Civil War, the lecture was supplemented by the section method of clinical teaching, which allowed for more personalized instruction.¹¹ In this form of teaching, groups of students, as small as 8 or 10 at the better schools, would spend 1 or 2 hours a day, 3 to 5 days a week, observing patient care in the

hospital and following the progress of selected cases. With section teaching, students were closer to patients than ever before.

However, the section method contained an inherent flaw. It did not incorporate the principle of “learning by doing,” as did laboratory instruction in the scientific courses.¹¹ Bedside section teaching was much more effective than the didactic methods of earlier years, but it was still demonstration and was no different than the lecture and demonstration in the scientific subjects. In section teaching, patients were cared for in the presence of students but not by students. Students were passive observers, witnessing rather than participating in the medical work. Although frequently perceived as practical bedside instruction, section teaching in reality was little more than an illustrated lecture. This pedagogic weakness was corrected only by the new clinical-teaching paradigm called the clerkship.⁸ Under this system, students not only received instruction in the hospital but became an active part of the hospital functions. Rather than visiting the wards for an hour a day, students were assigned 4 or 6 patients of their own and spent much of their day carrying out duties related to their patients' care.⁸ This method allowed students to experience rather than observe the conditions of medical practice.

The clerkship began to struggle because few medical schools had acquired control of teaching hospitals.¹¹ Although most schools had access to clinical facilities, they were severely restricted in how they could use those facilities. Therefore, clinical education was greatly hampered. Certainly this situation provides strong justification to the importance of quality clinical-education settings briefly discussed later in this paper. Medical schools had no responsibility for deciding whether students could work as clinical clerks, because permission of hospital boards was always required but seldom granted.¹¹ Clinical professors were also handicapped in their own research, since they were often denied access to patients for purposes of clinical investigation.

Hospitals began to tolerate teaching, reluctantly, as long as it was carefully regulated and did not interfere with their other functions. Until the latter 19th century, responsibility for medical education was seen as belonging to the schools, not the hospitals.¹¹ Hospitals were considered supportive for even the limited teaching they did allow. If students were felt to be bothering patients, they were just barred from the wards. After the Civil War, however, medical professors started to recognize that advances in medical knowledge and practice created a different set of requirements for clinical instruction.¹¹ In the late 19th century, many medical schools tried very hard to secure better clinical facilities.¹¹ One approach was for a school to build a hospital of its own.¹¹ This strategy offered an obvious advantage to a school, because then the faculty could make staff appointments and organize its clinical teaching without the threat of outside interference. Many schools adopted another approach: establishing educational affiliations with existing community hospitals.¹¹ This approach offered schools the advantage of not having to build and operate hospitals themselves. However, officials, reluctant to accept the newer teaching methods, were unwilling to offer their facilities to medical schools on terms the schools desired.¹¹ Thus, despite the attempts of many medical schools to obtain hospital facilities, there had been little success before 1910. The problem was clearly not any lack of interest on the part of the schools. The haphazard relationship between medical school and hospital, which had been quite common in the United States, needed to change.¹² The medical school needed complete and permanent control of the hospital staff and facilities for clinical teaching.¹²

In spite of these difficulties, it is notable that the clinical-clerkship program has stood the test of time.¹³ It is still considered as satisfactory an educational experience as it was in the early 1900s.¹³

Development of Athletic Training Clinical Education

As medical clinical education continued to develop and improve during the 20th century, the National Athletic Trainers' Association (NATA) was formally established in 1950.¹⁴ Athletic training historians indicate that athletic training curriculum development began in the 1950s and 1960s; however, athletic training clinical education more formally began taking shape in the 1970s.¹⁴ During this time, the NATA Professional Education Committee formalized a list of behavioral objectives that identified desired learning outcomes for the athletic training student based on the 11 required courses identified in Table [Table 11](#).¹⁴ This effort represented a significant early step toward identification of a specialized body of knowledge. In addition, a clinical clock-hour

requirement and a skill-competency checklist were created to guide and monitor development of the students' clinical skills.¹⁴ Yet because the scope of the behavioral objectives was dictated and restricted by the existing content of required courses, the behavioral objectives did not represent a true competency-based approach to education of athletic training students.¹⁴ For example, because a course in therapeutic modalities was not required, the curriculum did not necessarily contain competencies on modalities. Nevertheless, with the identification of relevant courses and development of corresponding learning objectives, the NATA Professional Education Committee began to identify a unique body of knowledge for the certified athletic trainer.¹⁴ In retrospect, the behavioral objectives developed during the 1970s were viewed as a conceptual framework for the first edition of the *Competencies in Athletic Training* developed by the Professional Education Committee in 1983.¹⁴

Table 1. Athletic Training Curriculum Course and Clinical Clock-Hour Requirements in the Mid-1970s

| |
|---|
| Anatomy (1 course) |
| Physiology (1 course) |
| Physiology of exercise (1 course) |
| Applied anatomy and kinesiology (1 course) |
| Psychology (2 courses) |
| First aid and safety (1 course) |
| Nutrition (1 course) |
| Remedial exercise (1 course) |
| Personal, community, and school health (1 course) |
| Basic athletic training (1 course) |
| Advanced athletic training (1 course) |
| Laboratory or practical experience in athletic training to include a minimum of 600 total clock-hours of clinical experience under the direct supervision of an NATA-certified athletic trainer.* |

*NATA indicates National Athletic Trainers' Association.

The *Competencies in Athletic Training* represented a major component of the 1983 NATA education-program guidelines.¹⁴ The competencies were based on the “performance domains” of a certified athletic trainer identified in the first role delineation study conducted by the NATA Board of Certification (NATABOC) in 1982.¹⁴ Incorporation of the subject-matter requirements and athletic training competencies into the 1983 guidelines represented an effort to promote the development of true competency-based athletic training education programs.

The NATABOC has historically offered 2 routes to certification. One requires education in the context of a formal educational program, whereas the other takes a more “hands-on” experiential route supplemented by a minimal amount of course work.¹⁴ From the 1970s until the early 2000s, students became clinically eligible to take the NATABOC certification examination by completing 600 to 800 clinical-experience hours in an approved or accredited program or 1800 clinical hours as an apprenticeship student and later 1500 hours as an internship student.¹⁵ Additionally, students were required to complete clinical experiences with contact and collision sports. In contrast to the development of clinical education in medical schools, athletic training professional preparation was initially more steeped in clinical experiences and less in didactic instruction.

Recent Trends in Allied Health Professions Clinical Education

In recent decades, clinical education in the allied health professions has become more structured and organized, progressing from somewhat haphazard learning experiences to deliberate and focused learning experiences. Responsibilities of the student, clinical instructor, and clinical-education setting have become more clearly understood and delineated. Before attention was given to the elements of this clinical-education triad, professional socialization seemed to be the primary thrust of clinical education. This socialization is a process whereby a person is accepted into a tradition and acquires the group's values and attitudes, interests, skills, and knowledge.¹⁶ Socialization, though, is not entirely directed toward the student's learning and understanding. An

element of socialization exists within any system of professional education, but education and socialization are 2 separate processes.¹⁷

Without appropriate attention, allied health profession students often felt that they were providing a labor force and being socialized into the profession rather than receiving focused clinical instruction. Students in the nursing,¹⁶ physical therapy,¹⁸ and athletic training¹⁹ fields have all encountered such attitudes. Students would conform to the expectations of their teachers and staff, concentrating more on external appearances such as “looking busy.”¹⁷ These students learned that they were expected to pick up the “job” and fill the vacant slot in the clinical setting. Today's athletic training students, however, receive close supervision during their clinical-education experiences. Certainly socialization plays an important role in professional preparation, but today's structured athletic training clinical education represents a significant step. In 1990, Knight²⁰ introduced the modularized concept of athletic training clinical education, in which students focus on prescribed competencies and proficiencies during their clinical-education experiences. The environmental, administrative, and personnel factors of a clinical-education–setting have been formally addressed in the fields of physical therapy and athletic training. In the early 1980s, 20 validated standards and associated criteria for the selection and evaluation of clinical-education centers in physical therapy were developed.^{21,22} In the late 1990s, 12 athletic training clinical-education–setting standards and associated criteria were subsequently developed.²³ Copyrighted evaluation forms for evaluating clinical settings are available at the NATA Education Council's website (www.cewl.com). Both sets of standards are considered relevant, clear, practical, and suggestive of high-quality clinical-education settings in these fields.^{22,23} Recommended as guidelines rather than as minimal requirements, they are helpful in forming and shaping an impression not only about a particular clinical setting but also about the requirements of clinical education in general. Thus, a more focused approach to clinical education had begun, replacing the more random or chance learning experiences of apprenticeships or internships with a preceptor or supervisor.

Other changes in the design of health professions curricula have recently occurred because of issues of public accountability, credibility, cost containment, outcome measurements, service orientation, and cultural diversity.^{24–27} With these changes came the realization that clinical education needed to be incorporated into the professional curriculum earlier so that students could become acquainted with the on-the-job experiences sooner.²⁸ The drawback of introducing the clinical component earlier in the curriculum means that students may be in a position to deliver health care before they have mastered the knowledge and skills necessary to safely provide this care. This situation may be a catalyst to more structured and supervised clinical education in that it is imperative to maintain close supervision of inexperienced students. However, this level of supervision can be costly to the health care facility in terms of decreased productivity of the clinical instructor relative to patient care.¹⁷ Clinicians are often so involved in patient care that they are unable to devote sufficient time and effort to the general professional education of clinical students. Educating students may sometimes have a relatively low priority in a setting dominated by patient care. Certainly, this seems fair because patient care is the primary mission of health care facilities. This was a strong concern in the formative years of medical education of physicians and continues to be an issue requiring attention in the clinical education of students in allied health professions education today. As well, it is important to note that since the 1970s, accredited institutions of higher education have been required to account for and define measurable outcomes for students at each level of the educational process.⁶ Clinical experiences are now also being based on measurable objectives that explicitly state what the student is expected to accomplish. Typically, undergraduate education in the allied health professions is now designed with the intention of providing students with experiences that help them to acquire minimal levels of clinical proficiency in the essential skills of their profession. Athletic training students are now being required to obtain these basic proficiencies, rather than clinical-experience hours, to qualify for the NATABOC certification examination.²⁹

Recent Developments in Athletic Training Clinical Education

The NATA has made great strides over the past 20 years in providing athletic training education programs with the guidance needed to develop the clinical portions of their programs. By June 1990, the American Medical Association (AMA) formally recognized athletic training as an allied health profession.¹⁴ In October 1990, an

initial meeting was conducted for the development of standards and guidelines for accreditation of educational programs for athletic trainers.¹⁴ The standards and guidelines were prepared by the Joint Review Committee on Educational Programs in Athletic Training (JRC-AT). The NATA and the Commission on Accreditation of Allied Health Education Programs ([CAAHEP], formerly the AMA's Committee on Allied Health Education Accreditation [CAHEA]) accepted and adopted the standards and guidelines in June 1991. The initial standards and guidelines and the JRC-AT were also approved and cosponsored by the NATA, the American Academy of Family Physicians, and the American Academy of Pediatrics. The current 2001 standards and guidelines³⁰ and the JRC-AT are also approved and cosponsored by the American Orthopaedic Society for Sports Medicine. The Commission on Accreditation of Allied Health Education Programs accredits entry-level education programs for athletic training upon the recommendation of the JRC-AT.³⁰ The standards and guidelines are used for the development, self-study, and evaluation of entry-level athletic training education programs.

Educational reform in the athletic training profession continues to evolve in the areas of curriculum, clinical education, and continuing education. In 1997, the NATA Board of Directors approved 18 initiatives recommended by the special Education Task Force established in 1994.³¹

The NATA Board of Directors subsequently established an Education Council to assist in the implementation of these initiatives. The overall goal of the reform was to enhance the credibility of the field within the health care professions and to better prepare athletic trainers to perform their function of caring for the physically active. The most significant of the 18 specific initiatives developed by the task force was to eliminate the internship route to certification, thus creating a standardized approach to athletic training professional preparation. This action was supported by a body of evidence indicating that the internship route no longer functioned to consistently prepare entry-level athletic trainers in accordance with the preferred standards of the profession.³¹

The National Athletic Trainers' Association Board of Certification certification-examination eligibility requirements will require that all students complete a CAAHEP-accredited entry-level athletic training education program.²⁹ This change takes place in 2004 and will bring athletic training in line with the credentialing process of other allied health care professions.²⁹

Another significant reform proposal made by the task force addressed the responsibilities and preparation of the clinical instructor. The NATA recommended to the JRC-AT that the CAAHEP's "Essentials & Guidelines for an Accredited Educational Program for the Athletic Trainer" be amended to include a guideline that certified athletic trainers complete professional training for their role as clinical instructors.³¹ The Commission on Accreditation of Allied Health Education Programs formally adopted the Approved Clinical Instructor (ACI) designation in the 2001 revised standards and guidelines.³⁰

Under direction of the Clinical Education Subcommittee of the NATA Education Council, Clinical Instructor Educator (CIE) seminars were developed and first conducted in June of 2000. An overriding goal of the seminars is to equip program directors or clinical-education coordinators with information and resources to serve as CIEs at their institutions. The CIEs train ACIs to effectively teach and evaluate the athletic training clinical proficiencies. In this way, clinical education would no longer be conducted under the assumption that all certified athletic trainers are naturally qualified to educate students. Just by virtue of being clinicians, certified athletic trainers do not have the knowledge or skills regarding the methods for teaching and evaluating the students under their supervision. The vast majority of athletic trainers have had no previous formal training in these areas.³¹

Another important initiative aimed to include the different clinical settings and their distinct populations within athletic training clinical education.³¹ The clinical skills required in various settings with various types of patients must be addressed. The athletic training profession asserts that its members are qualified to work in a variety of settings; however, until the NATA reforms were initiated, it was difficult to justify that assertion because students did not have access to the kinds of patients they are likely to encounter in those settings. For instance, a certified athletic trainer in the high school setting needs to have familiarity with adolescents. Clinical

experiences with patients in clinics also needed to be expanded. The 2001 CAAHEP standards and guidelines³⁰ recommend that athletic training clinical education include experiences in sports medicine clinics, physical therapy sites or rehabilitation clinics (or both), college or university health centers, hospital emergency rooms, physicians' offices, or other appropriate health care settings. In contrast to the previous requirement to complete clinical experiences with contact and collision sports, the standards and guidelines require students to gain exposure to upper extremity, lower extremity, equipment-intensive, and general medical experiences of both sexes.³⁰ Additionally, for the first time, attention is to be given to the selection and evaluation of these settings, including appropriate clinical instructors for the student.

In concert with the reform initiatives regarding elimination of the internship route to certification, creation of the CIE and ACI designations, and proactive use of diverse clinical settings, the NATA Education Council created a Competencies Committee in 1997 to review and expand the current NATA competencies in athletic training.³² During the period between 1982 and 1999, the NATA Board of Certification completed 4 role delineation studies. Concurrent with the most recent role delineation study, the Competencies Committee developed the third edition of the entry-level educational competencies. Since the second revision of the *Competencies* document in 1992, the competencies relative to the scope of athletic training expanded from 6 domains to 12 domains³³ (Table (Table2).2). For the first time, clinical proficiencies developed by the NATA Education Council were added within the appropriate domains. As before, the Educational Competencies described the cognitive, psychomotor, and affective requirements in athletic training professional preparation. The new clinical proficiencies synthesize similar cognitive, psychomotor, and affective teaching objectives and describe them in terms of measurable clinical skills.³⁴ As such, these clinical proficiencies are replacing clinical hours as the measure of a student's clinical progression and eligibility to sit for the certification examination. These proficiencies are now the basis for a student's clinical education, and clinical-experience hours are no longer considered an effective measure of a student's clinical learning.³⁵

Table 2. Athletic Training Educational Competency Domains

| |
|---|
| Risk management and injury prevention |
| Pathology of injuries and illnesses |
| Assessment and evaluation |
| Acute care of injury and illness |
| Pharmacology |
| Therapeutic modalities |
| Therapeutic exercise |
| General medical conditions and disabilities |
| Nutritional aspects of injury and illness |
| Psychosocial intervention and referral |
| Health care administration |
| Professional development and responsibilities |

A continuation of the competency-based design of athletic training education programs can also be seen in the third edition of the CAAHEP standards and guidelines.³⁰ This edition is presently used as a guide to develop entry-level athletic training education programs accredited by CAAHEP; it will be required in all programs starting with the 2002–2003 academic year. Clearly, professional-preparation requirements and responsibilities in athletic training clinical education have grown dramatically. Athletic training clinical education compares favorably with that found in medical education and at least several other allied health preparation programs.

Future Directions in Athletic Training Clinical Education

Clinical education in medicine has particularly evolved and developed over the past century and over the past 30 years in numerous allied health fields. Clinical education in athletic training, as in numerous allied health professions, likely evolved from the medical-education model for training physicians in which clinical experiences serve as a critical component for student learning. The clinical instructor, or preceptor, plays a vital role during these clinical experiences. The clinical instructor has been identified as the person most critical to

the students' learning.³⁶ Similar to what has occurred in nursing,³⁷ though, it may be increasingly difficult for today's certified athletic trainer to find adequate time to accept extra responsibility for teaching athletic training students. The general trend is toward increased work loads to provide medical care coverage for expanding sport seasons and off-season conditioning, practice, and competition schedules—with fewer resources and pressures from all sides. A greater responsibility for the teaching, supervising, and assessing of students may often be unrealistic. Similar to what has occurred in nursing,³⁷ it is possible that athletic training clinical instructors will encounter role stress when conflict occurs between the needs of the athlete or patient and the needs of the student. In this situation, accountability to the patient will take precedence.³⁸ Because athletic training students are no longer expected to be a labor force to provide athletic medical coverage, similar to what occurred in nursing,^{39,40} there is less urgency for permanent staff to ensure that students are able to perform clinical care adequately in order to become useful members of the health care team. Intentional and incidental peer education, in which students assist one another in learning and practicing clinical skills and socializing into the profession,⁴¹⁻⁴³ will likely become more important in athletic training clinical education.

Interestingly, the gap in clinical supervision of students may not be adequately filled by academic faculty. They may have superior teaching skills but often do not have clinical credibility among clinicians and students.³⁷ In our opinion, ideally athletic trainers with primarily an academic role need to remain at least somewhat clinically active. In addition to providing clinical supervision, these athletic training faculty must find a way of demonstrating their unique role of integrating academic knowledge with clinical practice. In this process, they have the opportunity to infuse new information and practice into the clinical environment for the benefit of both student and clinician.³⁷ Particularly important here is that they model how to seek evidence to support their practice decisions. Athletic training research will have increasing value in this process. According to a recent editorial, the NATA Education Council clinical proficiencies, which provide a strong framework to assess the common practices of athletic trainers, need critical review to establish the guidelines that will define the educational preparation and clinical practice of certified athletic trainers in the 21st century.⁴⁴ In this way, improved clinical education will strengthen the best practice of athletic training. Similarly, athletic training clinical instruction itself should be subjected to rigorous educational research in order to develop an understanding and appreciation of evidence-based clinical teaching practices.

The 21st-century student will also need to be purposefully addressed and accommodated in the educational process. The new technology of learning will suit athletic training education well. Highly decentralized, Internet-moderated, satellite-facilitated, portable digital-assisted, and distance-based learning models, while in their infancy, are clearly a part of the emerging models for education in the 21st century.⁴⁵ The classroom, teacher-driven learning model no longer predominates, and accountability for ensuring that learning occurs is shifting to the student; however, many teachers and students are not yet ready for this shift in accountability and ownership for learning.⁴⁵ Further, a current trend in college student demographics indicates that more students in the 21st century will complete college on a part-time basis.⁴⁶ These part-time students will require more time to complete a degree. Clinical schedules for these students may have to be more flexible and creative, not compromising clinical skills in the process.⁴⁶

Athletic training professional preparation has undergone recent reform to move from apprentice-based education to more formal and structured clinical education. Continuation of this process will require deliberate organization of clinical experiences³⁰; selection, development, and administration of clinical settings^{4,23}; selection, training, and evaluation of clinical instructors⁴⁷; and the appropriate type and amount of clinical supervision.⁴⁸ Athletic training educators who avail themselves of the numerous graduate programs worldwide dedicated to teaching individuals how to direct, research, or improve the education of health professionals will be better prepared to educate athletic training students. Without a doubt, the future will see the development of more of these programs, as professionals with special training in health professions education become more involved at institutions worldwide.⁴⁹ Similarly, numerous education journals in the health professions (eg, *Medical Teacher*, *Academic Medicine*, *Journal of Nursing Education*, *Physical Therapy*, *Journal of Allied Health*) and textbook series (eg, *Springer Series on Teaching Nursing*) can serve as valuable resources for the athletic training educator and represent model work to emulate. Athletic training clinical education has entered

an exciting era in its history. Much lies ahead for developing and improving the preparation of the athletic trainer clinician.

REFERENCES

1. National Athletic Trainers' Association Education Council Clinical education definitions. Available at: <http://www.cewl.com>. Accessed March 21, 2002.
2. Jarski R W, Kulig K, Olson R E. Clinical teaching in physical therapy: student and teacher perception. *Phys Ther*. 1990;70:173–178.
3. Weidner T G, August J. The athletic therapist as clinical instructor. *Athl Ther Today*. 1997;2:49–52.
4. Laurent T, Weidner T G. Clinical-education–setting standards are helpful in professional preparation of employed, entry-level certified athletic trainers. *J Athl Train*. 2002;37(suppl):S-248–S-254.
5. *Department of Education: Physical Therapy Fact Sheet*. American Allied Health Physical Therapy Association; Alexandria, VA: 1994. p. 4.
6. Gandy J. Preparation for teaching in clinical settings. In: Shepard K F, Jensen G M, editors. *Handbook for the Physical Therapist*. Butterworth-Heinemann; Boston, MA: 1977. pp. 122–126.
7. Ford C E. *Clinical Education for the Allied Health Professions*. Mosby; St Louis, MO: 1978. p. 1.
8. Osler W. *The Hospital as a College: Aequanimitas and Other Addresses*. Blakiston's Son & Co; Philadelphia, PA: 1928. p. 121.
9. Packman C H, Krackov S K. Practice-based education for medical students: the doctor's office as a classroom. *Teach Learn Med*. 1993;5:193.
10. Kaufman M. In: *American Medical Education: The Formative Years, 1765–1910*. Greenwood Press; Westport, CT: 1976. The American Medical Association, 1847–1860; pp. 93–108.
11. Ludmerer K M. In: *Learning to Heal*. Basic Books; New York, NY: 1985. The plight of clinical teaching; pp. 152–165.
12. Welch W. In: *Papers and Addresses*. The Johns Hopkins University Press; Baltimore, MD: 1920. The relation of the hospital to medical education and research.
13. Lippard V W. *A Half-Century of American Medical Education*. Macy Foundation; New York, NY: 1974. p. 10.
14. Delforge G D, Behnke R S. The history and evolution of athletic training education in the United States. *J Athl Train*. 1999;34:53–61.
15. Grace P. Milestones in athletic trainer certification. *J Athl Train*. 1999;34:285–291.
16. Melia K. *Learning and Working: The Occupational Socialization of Nurses*. Tavistock; London, UK: 1987.
17. Jarvis P. *Professional Education*. Croom Helm; Beckenham, UK: 1983.
18. Harris D, Naylor S. Case study: learner physiotherapists' perceptions of clinical education. *Educ Training Tech Intl*. 1992;29:124–31.
19. Davis C, Misasi S. Student athletic trainer vs. athletic training student: get over it and get on with it! *NATA News*. 2001 Aug;16
20. Knight K L. *Clinical Experiences in Athletic Training*. Human Kinetics; Champaign, IL: 1990.
21. Barr J S, Gwyer J, Talmor Z. Evaluation of clinical education centers in physical therapy. *Phys Ther*. 1982;62:850–861.
22. Barr J S, Gwyer J, Talmor Z. *Standards for Clinical Education in Physical Therapy: A Manual for Evaluation and Selection of Clinical Education Centers*. American Physical Therapy Association; Washington, DC: 1981.
23. Weidner T G, Laurent T G. Selection and evaluation guidelines for clinical education settings in athletic training. *J Athl Train*. 2001;36:62–67.
24. Seaton J D. Clinical faculty issues. In: Ford C W, editor. *Clinical Education for the Allied Health Professions*. Mosby; St Louis, MO: 1978. p. 159.
25. Bok D. Reclaiming the public trust. *Change*. 1992;24:13–19.
26. Winston G C. Hostility maximization and the public trust. *Change*. 1992;24:20–27.
27. El-Khawas E. *Campus Trends 1993*. American Council on Education, Higher Education Panel Report; Washington, DC: 1993. Publication 83.

28. Irby D M. Clinical teaching and the clinical teacher. *J Med Educ*. 1986;61:35–45.
29. National Athletic Trainers' Association Board of Certification *Certification Update*. National Athletic Trainers' Association Board of Certification; Omaha, NE: Winter. 2000. Change in curriculum route requirements. pp. 5–6.
30. Commission on Accreditation of Allied Health Education Programs Standards and guidelines for an accredited educational program for the athletic trainer. Available at: http://www.caahep.org/standards/at_01.htm. Accessed March 21, 2002.
31. McMullan D. NATA Board takes first step in reform. *NATA News*. Feb, 1997. pp. 4–6.
32. Koehneke P. Competencies in education committee seated, goals set. *NATA News*. Feb, 1998. pp. 30–31.
33. National Athletic Trainers' Association *Athletic Training Educational Competencies*. 3rd ed National Athletic Trainers' Association; Dallas, TX: 1999.
34. Houglum P, Weidner T. Terminology: a rose is a rose, but according to whom? *NATA News*. Dec, 2001. pp. 40–41.
35. Starkey C. Reforming athletic training education [editorial] *J Athl Train*. 1997;32:113–114.
36. Campbell I E, Larrivee L, Field P A, Day R A, Reutter L. Learning to nurse in the clinical setting. *J Adv Nurs*. 1994;20:1125–1131.
37. MacCormick M. The changing role of the nurse teacher. *Nurs Stand*. 1995;10:38–41.
38. Pyne R. Breaking the code. *Nursing (Lond)* 1992;5:8–10.
39. Harding C, Greig M. Issues of accountability in the assessment of practice. *Nurs Educ Today*. 1994;14:118–123.
40. Beckett C. Student status in nursing: a discussion on the status of the student and how it affects training. *J Adv Nurs*. 1984;9:363–374.
41. Triggs Nemshick M, Shepard K F. Physical therapy clinical education in a 2:1 student-instructor education model. *Phys Ther*. 1996;76:968–981.
42. Parkes K R. Stressful episodes reported by first-year student nurses: a descriptive account. *Soc Sci Med*. 1985;20:945–953.
43. DeClute J, Ladyshevsky R. Enhancing clinical competence using a collaborative clinical education model. *Phys Ther*. 1993;73:683–689.
44. Denegar C R, Hertel J. Clinical education reform and evidence-based clinical practice guidelines [editorial] *J Athl Train*. 2002;37:127–128.
45. Porter-O'Grady T. Profound change: 21st century nursing. *Nurs Outlook*. 2001;49:182–186.
46. Martin M, Buxton B. The 21st-century college student: implications for athletic training education programs. *J Athl Train*. 1997;32:52–54.
47. Weidner T G, Henning J M. Being an effective athletic training clinical instructor. *Athl Ther Today*. 2002;7(5):6–11.
48. Weidner T G. Clinical supervision of athletic training students at colleges and universities needs improvement. *J Athl Train*. 2002;37(suppl):S-241–S-247.
49. Cantor J C, Cohen A B, Barker D C, Shuster A L, Reynolds R C. Medical educators' views on medical education reform. *JAMA*. 1991;265:1002–1006.