

Incorporating Mobile Learning into Athletic Training Education

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Objective: To introduce and present techniques for incorporating mobile learning into athletic training education. **Background:** The matriculation of digital natives into college has stimulated the identification and development of new teaching and learning strategies. Electronic learning (e-learning), including the use of learning management systems, has been combined with traditional classroom lectures and lab activities to address the needs of these technologically savvy students. Learning management systems offer valuable options to students, but still rely on a computer terminal to interface with the material. Restrictions on when and where a student can “plug-in” to learn places limitations on e-learning. Mobile learning (m-learning) is a sub-set of e-learning that uses hand-held devices to allow flexibility in learning at any time and any place. M-learning involves the use of mobile devices such as mobile phones, personal digital assistants (PDAs), and

portable media players for the purposes of acquiring and disseminating knowledge. A variety of methods have been identified for incorporating m-learning into higher education. Articles regarding the use of m-learning, specifically in health care education, are limited.

Description: Descriptions of m-learning applications in higher education are presented. Examples of techniques are offered to aid the athletic training instructor in implementing the m-learning principles into the classroom and clinical settings.

Application: Athletic training education lends itself well to m-learning. Athletic training students can utilize mobile devices to prepare for an upcoming class session, participate during class, review and study course materials, communicate with teachers and peers, enhance clinical education, and document clinical experiences.

Key Words: digital natives, e-learning, podcasting

Today's students are digital natives; they have grown up with a variety of digital technology as a natural part of their daily lives. Teaching and learning methods that incorporate the use of mobile technology may be successfully used to engage this new generation in the educational environment. Mobile learning (m-learning) takes advantage of portable technologies, eliminating time and location hindrances to educational opportunities and gaining knowledge. Articles addressing the use of m-learning in health care education are limited, with athletic training education scarcely mentioned. Therefore, the purpose of this article is to introduce the concept of m-learning and provide athletic training educators with suggestions for incorporating it into their classroom and clinical settings.

The Development of Mobile Learning

The current generation of digital learners has prompted the re-examination of how learning materials are designed and delivered. The discontinuity between current students, the millennials, and the previous generation is accentuated by the amount and variety of media to which they were exposed growing up.¹ University students are native to the digital era, having not experienced a time without personal computers or the World Wide Web. By the time

students born after 1982 are 21 years old, they will have engaged in video game play two times and watched television four times more often than reading.² Parallel to these recreational activities is a shift in the way today's students learn. Digital natives think and process information differently than their predecessors. They like to multi-task, prefer receiving information quickly with random access, function best when networked, and desire instant gratification and frequent feedback.² The textbook and lecture learning environment experienced by past generations does not adequately engage these students' learning preferences.

For over a decade, electronic learning (e-learning) has been combined with traditional classroom lectures and lab activities to enhance both the independent and collaborative learning environments. Many universities have caught the first wave of e-learning by offering content, facilitated activities, collaboration, and communication online with a range of learning management systems such as Blackboard and WebCT.¹ These learning management systems offer valuable options to students, but still rely on a computer terminal to interface with this material.

Restrictions to when and where a student can “plug-in” and learn has placed limitations on e-learning. M-learning is a sub-set of e-learning that uses hand-held devices to allow students to learn at any time and any place. M-learning devices include mobile phones, portable digital assistants (PDAs), and portable media players such as iPods. Because they are always on the move, the new generation of learners uses these types of mobile

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technology daily for entertainment and socialization. In fact, the ability to use mobile technology has become a necessary skill for students and workers to function in today's society.³

Over the past 10 years, m-learning has filtered into a wide variety of social climates, including business and education. Mobile devices provide new opportunities for independent investigations, practical fieldwork, continuing education, and instant access to knowledge.⁴ Because of the prevalence of mobile technology and the importance of anywhere/anytime access to information, the millennial students and generations to follow will expect course materials to be delivered on mobile devices. Educators and learning institutions may be challenged to use the communication media most familiar to this generation; however, the integration of m-learning offers flexibility and will mesh with the digital lifestyle of today's students.¹

Mobile Learning in Higher Education

M-learning has been incorporated into a variety of academic disciplines including foreign language,^{5,6} public speaking,⁷ the sciences,^{4,8,9} and sociology.¹⁰ As an example, mobile phones were first used with foreign language students to introduce them to new vocabulary and encourage daily application of previously learned words.^{5,6} Learners were sent text and video messages to their mobile phones at timed intervals. The students responded favorably to m-learning citing the benefits of continuous exposure to the new language between class sessions and increased in-class time spent speaking and hearing the target language. Compared with students urged to regularly study identical materials on paper or the Web, students receiving mobile e-mail messages scored higher on exams.⁶

Students at The University of South Dakota used personal digital assistants (PDAs) to complete peer evaluations of speeches by beaming the results to the speaker who could view a summary of the evaluations.⁷ PDAs were also used in Singapore classrooms to address significant communication and cultural barriers that contributed to low levels of student-instructor interaction. Instructors provided a pop quiz during class and students replied using multi-media messaging service (MMS). The instructor's device summarized the responses and determined if more time should be devoted to a particular topic. Students could also send questions to the instructor who monitored the messages and decided if and when to respond, greatly improving classroom management.¹¹

Portable media players (PMPs), the Apple iPod being the most notable, are often used for playing podcasts. A podcast is a media file that is distributed over the internet. Podcasts have become a popular medium for the dissemination of audio and video content in music, entertainment, and news. Podcasts offer obvious opportunities for distance learning, but several universities are using podcasts to deliver supplementary lecture materials for campus-based students. Copley⁸ produced audio and video podcasts of lectures for undergraduate and master's-level marine science courses at the University of Southampton.

The podcasts were available for download from the Blackboard learning management system. The primary use of the podcasts was for revision and preparation for assessments. A majority of students indicated video podcasts to be their preferred format for supplementary lecture materials. In the UK, microbiology lectures at the University of Bradford have been delivered as audio podcasts.⁹ Students taking the course watched or listened to virtual lectures on their PMPs, mobile phones, or computers in their own time. Rismark¹² advocates utilizing podcasts to introduce students to new material prior to a formal class session on the topics. Duke University issued iPods to more than 1600 new undergraduate students in August 2004 to disseminate course content, record classroom and field interactions, support study tools, and to store and transfer files.¹³

One hundred West Chester University students in an introductory survey course in sociology were given the opportunity to use a m-learning product developed by HotLava Software to practice and review questions on web-enabled mobile phones, PDAs, and other internet capable mobile devices.¹⁰ Students who utilized m-learning demonstrated a higher level of knowledge of the subject matter covered in the course when compared to students who chose not to use the tools.

Field-based students can benefit from mobile devices that support real-time data logging as part of fieldwork activities. At the Pennsylvania State University at Delaware County, geoscience students used PDAs to enter field data into a spreadsheet for analysis rather than using paper and pencil first, followed by transcription to a computer later.⁴ PDAs were used by students in a one-year science teacher training course at the University of Bristol, UK. These students spent 24 weeks in a partner school, making access to conventional educational resources, including documentation procedures and forms, difficult. Students were given PDAs with mobile phone connectivity to alleviate this problem.⁴

Learning management systems, such as Blackboard and WebCT, need not be restricted to e-learning environments. Ramsden¹⁴ describes a study that assessed the ability of these learning management systems, particularly Blackboard, to be delivered wirelessly to a Palm Pilot. Students in an economics course at the University of Bristol successfully used the PDAs to access course documents and PowerPoint slides, participate in discussion boards, communicate through email, and collaborate on group work through uploading and sharing files.

According to Yuen and Yuen¹⁵ a PDA's beaming capabilities provide benefits in teaching and learning environments. For example, in group seminars, students can use beaming capability to send and receive documents, spreadsheets, and data to other group members without wiring and downloading processes. In addition, students can use beaming to send questions, assignments, quizzes, and exams to professors, while professors can send grades and answers to students instantly.¹⁵

Mobile Learning in Health Care Education

Articles regarding the use of m-learning specifically in health care education are limited. Currently, PDAs are primarily the only mobile device researched in health care education. Kneebone and Brenton¹⁶ described the use of PDAs by experienced healthcare workers in the UK who undertook training for a new professional role, the Perioperative Specialist Practitioner (PSP). PSP students were asked to keep a learning diary on their PDAs to compile a portfolio of evidence that tracked their training and provided detailed and accurate records of clinical activities and learning competencies. The PSP students reported that the PDA database for logging learning activities was effective for on-the-spot information entry. At the University of British Columbia's School of Nursing, students used PDAs to record their clinical activities and achievements, and to reflect upon their experiences in order to develop professional self-evaluation skills and enhance their learning.¹⁷

Mobile Learning in Athletic Training Education

Many of the m-learning applications described previously can be applied to athletic training education. M-learning can be incorporated into every facet of a student's education. Students can use mobile devices to prepare for an upcoming class session, participate during class, review and study course materials, communicate with teachers and peers, enhance clinical education, and document clinical experiences.

Using M-learning for Class Preparation

Class preparation using mobile devices may involve a variety of activities, including: reading of assigned material; reviewing previously learned concepts that will be expanded upon; and using podcasts to introduce students to an upcoming lecture. Professors could introduce the new topic and guide the students through new vocabulary, concepts, skills, etc. prior to class. Technology is already being used to download books onto electronic devices. These books, called e-books, are often downloaded to devices specific for the purpose called e-book readers. However, some models of other mobile devices such as PDAs and mobile phones have the same capability. Some authors and publishers are hesitant to offer their titles in e-book format; however, it may not be too far into the future that chapters or entire textbooks are made available. Posting articles required for class on a learning management system or emailing them to students to view on mobile devices may encourage students to complete the required reading since they would have anywhere/anytime access without carrying multiple heavy textbooks or printing lengthy articles. While students can benefit from having entire lectures available as downloadable podcasts, instructors may also find this method advantageous to maximize student learning. If students were required to listen to a podcast lecture prior to coming to class, the instructor could quickly assess their understanding with a quiz administered through short message service (SMS). Class

time could then be spent engaged in group discussions, grappling with case studies, and practicing psychomotor skills. This type of learning and study technique could be adapted to a variety of course materials.

Using M-learning to Improve Class Participation

Class participation can take on a variety of forms including answering and asking questions, involvement in group activities, and performing peer evaluations. Mobile devices can enhance all of these tasks. Students can use SMS to respond to multiple choice or true/false questions posed by the instructor or another student. Software called ClassInHand¹⁸ allows the instructor to pose a question to the class and view a distribution of the responses on a mobile device. Students are capable of submitting their own questions or comments that display immediately on the instructor's device. This type of technology enables professors to frequently monitor student understanding and encourages otherwise hesitant students to pose questions, ask for clarification, or make comments. Students engaged in group work will find mobile devices helpful for sharing documents electronically. In-class assignments may require referencing previous class notes, information from other courses, or internet sources; all of which can be accessed through mobile devices. These devices can also be used to perform peer evaluations of presentations and skill demonstrations, with the professor choosing to view the evaluations himself and/or allow the student to view a summary of the ratings.

Using M-learning for Studying Course Material

Students currently use a variety of methods for studying course material including rereading chapters and/or articles, updating and reviewing class notes, listening to recorded course lectures, taking practice quizzes, participating in study groups, and practicing psychomotor skills; all of which can be enhanced with mobile devices. If students have access to podcasts of each lecture and/or class discussion, they will be able to replay these podcasts as necessary. Students will find this helpful for reviewing difficult topics and for filling in notes that were missed during class. Professors can utilize SMS to periodically send practice questions and scenarios. Students and clinical instructors may appreciate this type of occasional prompt for discussion and skill practice during what would otherwise be "down time". Podcasts of psychomotor skills would be beneficial as well. Students could practice with peers outside of class and have a reliable source demonstrating the correct technique, thereby eliminating arguments between students about "the right way" to do something. Students could also be encouraged to use the video clips during laboratory sessions for skill review and practice. This technique would greatly benefit the teacher and students, especially in larger classes where providing individual instruction can be difficult.

Using M-learning to Enhance Clinical Education

The curriculum for CAATE-accredited athletic training education programs requires a minimum two full academic years to complete the clinical education competencies and proficiencies. These clinical experiences require students to develop knowledge and skills in environments that are removed from traditional learning sites, such as the library and classroom, and away from connected computers and networks. Students need regular access to course materials and resources as well as access to other students. They need to document injury and treatment information, complete assignments, demonstrate proficiencies, and be evaluated by their approved clinical instructors while at their clinical experience site. These activities present challenges that mobile technologies can meet.

Mobile devices provide connectivity for spontaneous communication and collaboration. Athletic training students could potentially communicate with fellow students at different sites about clinical situations that arise. Pictures could be taken of an injury and beamed to fellow students, allowing more students to benefit from a unique situation. Evaluation findings could also be documented and then beamed to other students for discussion, and voice recording devices would allow students to record evaluation findings to be transcribed when in the athletic training room after practice or a game. Documentation forms compatible with mobile devices could be created for onsite completion and submission, as could course assignments and student evaluations. The PDA-based electronic portfolios discussed by Kneebone and Brenton¹⁶ could be valuable to athletic training students as well. Students could document learning opportunities and reflect on their experiences in real-time. Clinical instructors could use the student's mobile device to record video of the student performing psychomotor skills, which they could then view, critique, and send to other students or professors for feedback. Cuppett¹⁹ described how to document students' exposure to and progression towards clinical skills on PDAs using Learner Profile Software. The author identified the approved clinical instructor's ability to document completion of clinical skills when it happened, even on the field or the court, as a benefit of the PDA. This type of mobile documentation is a logical follow-up to the m-learning applications described.

Conclusion

In addition to the previously made suggestions for incorporating m-learning, athletic training students would benefit greatly from the organizational components mobile devices offer. Students with coursework, clinical responsibilities, personal obligations, and possibly part-time jobs need good time-management skills. Today's mobile devices provide calendars, contact information databases, and task/appointment reminders that can help keep students organized. M-learning has a definite place in athletic training education, with endless implementation opportunities. Today's high-tech students require innovative

teaching methods to sustain interest and instill ownership in their learning. Similar to the e-learning environments currently used, students will benefit the most from a blended approach, with m-learning applications used to supplement traditional teaching and material distribution methods.

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