Designing Online Learning Modules in Kinesiology

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ABSTRACT

Online-learning environment can substantially improve student learning and retention of key health concepts. In this case report, we describe our approach for the design of online learning modules to teach concepts in an undergraduate health science/kinesiology curriculum. This report describes our use of these concepts in two lower division and one upper division college courses at a major university in Texas. While our approach is based on our experience in health science/kinesiology courses, we anticipate that this report will inspire educators to explore the use of online learning principles in a variety of college courses.

Keywords

LMS, Hybrid instruction, Health science, Kinesiology, Exercise Science

Introduction

Advances in computer technology and software have opened a new age of classroom instruction. Student learners now have the opportunity to take courses that are either fully online or have a blended traditional/online, hybrid learning experience. These learning environments carry over well to corporations and professional employees. The findings of research studies have supported the notion that the key to successful online learning is the formation of an effective learning community as the vehicle through which knowledge is transmitted (Palloff & Pratt, 2007). The traditional focal points of an online learning community are: selecting the learning environment best suited for the purpose of subject material, the role of the instructor, and the role of the student. The current focus of health education research is to examine how the utilization of instructional technology can be used to effectively and efficiently achieve the demonstration of key learning objectives (Palloff & Pratt, 2007).

When online learning experiences are properly structured, they can significantly enhance a student’s ability to learn and retain information related to complex topics found in the health sciences (Gallagher et al., 2005; Herse & Lee, 2005; McFarlin, 2008; McFarlin & Jackson, 2008). Learning games play a key role in the design of effective online learning solutions (Gallagher et al., 2005). Such games or interactive learning activities allow the learner to self-test their knowledge base. The key to successful use of online learning is to follow a set of established best practices. Best practice approaches can be simple or complex depending on the educational objectives the instructor or course designer is trying to achieve. We have previously published reports regarding the effectiveness of our approach (McFarlin, 2008). In this model (McFarlin, 2008), students who took a hybrid course earned higher letter grades than students in a traditional lecture based course.

One major advantage of online learning is that it has redefined the role of the health educator such that they are a facilitator at the center of an active learning environment rather than the instructor of the content (Junco, 2007). Some authors have suggested that this new focus provides evidence that the traditional authoritative relationship between the educator and student needs to be reexamined (Palloff & Pratt, 2007). In fact many health educators have embraced the strengths of student directed active learning environment and blended these with traditional health education models (Goldberg et al., 2006).

The key purpose of this manuscript is to describe the approach we developed for the design and implementation of online learning modules in undergraduate kinesiology courses. We have previously demonstrated that our learning module design approach is associated with an improvement in student grades (McFarlin, 2008) and can serve as the foundation of an anti-obesity program targeting college students (McFarlin & Jackson, 2008).
Program Approach

Student Population

Today’s students are part of the net generation, born after the invention of the first computer. The key characteristics of net generation students are: that they are driven by commitment, social and team-oriented, experiential, and multitask learners (Junco & Mastrodicasa, 2007). Net generation students want to reach and draw their own conclusions through exploration. In addition, these students have developed a cognitive processing style due to their learning process through the use of familiar technology (Junco & Mastrodicasa, 2007). As such, traditional lecture courses do not always engage these students at the highest level. Redefining this role of the teacher does not imply a reduction in student-faculty contact hours. Instead, a use of technology through an online learning environment relieves the instructor from being primarily responsible for delivering core content and enables them to use the physical classroom for engaging students in higher level seminar-style discussions. Well-designed online/hybrid instruction represents one means by which the needs of today’s students can be addressed (McFarlin, 2008).

Targeted Courses

The current report utilized information collected during the design of three courses in the Health and Human Performance department at the University of Houston. The courses were KIN1252 (Foundations of Kinesiology, Full Online Delivery), KIN1304 (Public Health Issues in Physical Activity and Obesity, Full Online Delivery), and KIN3306 (Physiology of Human Performance, Hybrid Delivery). KIN1252 and KIN1304 utilize online learning modules (LM) as a primary content delivery tool targeting freshmen and sophomores, while KIN3306 uses LMs to provide introductory information for traditional in-class lectures targeting juniors and seniors. While the fully online and hybrid courses differ in their content and approach we have found that learning and content retention is similar (McFarlin, 2008).

Figure 1: Learning Module Components
Course Design and Administration

Proven successful online learning environment platforms can be used to standardize the teaching of a large number of students in introductory kinesiology courses (McFarlin, 2008; McFarlin & Jackson, 2008). For this manuscript, we selected to examine our approach to designing online learning modules for three unique courses. Two of these courses were fully online (KIN1252 and KIN1304), while the third course was hybrid (KIN3306). Our approach to these three courses has been designed to address the unique learning needs and expectations of today’s students. Most of these students have grown up with the Internet and expect to instantly have access to all learning materials necessary (Goldberg & McKhann, 2000; Knight & Wood, 2005; Goldberg et al., 2006).

Our courses were administered using the Blackboard Vista learning management system (LMS), which is commonly used at colleges and universities in the United States. Each course included a series of 8-9 learning modules (LM) that have been designed by our course development team headed by Dr. McFarlin. Each LM covers a different topic, but the fundamental structure of each LM is the same. Each LM includes (Figure 1) an enhanced, narrated online lecture presentation; downloadable lecture notes; downloadable lecture audio; online learning games; learning games that can be transferred to an Apple iPod; and a learning assessment quiz. We have previously demonstrated that this approach is effective at increasing learning of key concepts (McFarlin, 2008; McFarlin & Jackson, 2008). In our approach, students learn concepts by initial exposure (in the lecture) complemented with reinforcement (through learning games). The objective of this case report is to provide a guide for the development of online/hybrid LMs using our approach.

Structure of Online Lectures

Our approach relies on the development of custom online lectures. Our development process for these lectures included a multi stage approach. Initially, we developed storyboards to outline how the lecture would achieve specific learning objectives. The storyboards typically go through 2-3 revisions prior to the development of the final PowerPoint based storyboard. At this time we develop a written script to accompany each slide. The slides we develop are designed to be media-rich with minimal written text. In our experience this allows the learner to focus on the content rather than trying to memorize all of the written text (McFarlin, 2008; McFarlin & Jackson, 2008). Once the PowerPoint slide deck is complete, we utilize Articulate Presenter from the Articulate Studio (New York, NY) to record our narrations and animations. Articulate Presenter is the ideal tool for individuals who are new to courseware design, as well as advanced designers, because of its ease of use and integration directly into PowerPoint 2007 (Figure 2).
In addition to slide narration/animation, Articulate Studio is able to embed graded or ungraded learning games directly into the enhanced lecture. If the final product is used with an LMS, then the enhanced lecture can directly report student responses to questions. The use of learning games also allows the instructor to control the student’s flow through the lecture in a non-linear fashion (Figure 3). For instance, we typically integrate ungraded learning games every 5-7 slides. The learner must score 70% correct in order to “unlock” the next section of the lecture, if they score <70% then they will be directed to a series of remediation slides. This approach is significant because it allows the lecture to be customized to meet the unique learning needs of each student that watches it. Traditional classroom lectures have long been bound by restrictions that force presentation of material in a linear fashion. One major advantage of online instruction is that this restriction can be removed allowing for learning experiences to be custom tailored to the unique needs of each learner.

The final output of Articulate Presenter is a flash-based SCORM compliant lecture that can be loaded in our LMS (Figure 4). In addition to the interactive lecture, Articulate also allowed for us to produce a “notes” format (in PDF format) and an audio version that can be made available for the students to download for offline review. After the audio is produced, we load this into GarageBand (Apple audio editing software) and use .jpg images of the lecture slides to develop enhanced Podcasts. The enhanced Podcasts are made available for download within each LM folder. Combination of online enhanced lectures, downloadable notes, and downloadable enhanced Podcasts provides the learners with three distinct mediums for exposure to material associated with the LM’s learning objectives.
Learning Games

Interactive gaming technology is a useful tool to enhance student exposure to key course concepts. These tools have become popular in the education realm in the past 10 years (Annetta & Holmes, 2006). When used to complement other learning activities, research has demonstrated that learning games are an effective way to reinforce key learning objectives (Sanchez et al., 2009). In our present design, we utilize two types of learning games. First, we produced basic learning games to work online via Blackboard using a question bank imported into Respondus Studymate (New York, NY) software. Activities include interactive flash cards, crossword puzzles, word finds, fill-in-the blank, matching, and challenge questions (Figure 5). The second type of learning game used was a portable quiz show format (iQuiz) that works with specific models of the Apple iPod. We are presently working to develop this interaction to work with other brands of portable media players and mobile phones. The combination of these basic learning games allows the learners to interact with and engage in the content associated with a specific LM’s learning objectives.

![Interactive Learning Game](image)

Figure 5: Interactive Learning Game

Formal Assessment of Learning Objectives

Once the student has completed the learning activities for a given LM, they are provided the opportunity to complete a graded assessment using the Blackboard assessment function. In this assessment, students are randomly presented with a set of 10 questions from a question bank with a minimum of 60 questions. The learners are allowed unlimited attempts to take an assessment and the final grade is recorded as the highest of their attempts. After each attempt, students are notified of which questions they have missed, but not the correct answer to those questions. The vast majority of students in our courses review the LM material again to locate the correct answer, which is yet another strategy that we use to reinforce learning. The formal LM assessments (i.e. count toward their grade) only account for a small portion of their final grade. The major determinant of the learner’s final grade in one of our courses is traditional examinations that are given either in the classroom (KIN3306) or online (KIN1252 and 1304).

Course Evaluations

The approach to the design of online learning modules, presented in this report as developed over a number of years use student feedback from formal and informal course evaluations. Effective course and LM design requires feedback from the learner. The efforts of the course design team will only be effective if the students feel that the learning matches their unique needs. As such, our design team has been proactive at soliciting feedback from our learners. We are interested in encouraging our students to provide constructive and honest feedback regarding the course. We collect this information through a series of anonymous surveys that are given throughout the semester.
Student input is extremely important to the success of designed courses and it is important that the course design team continues to make this a major component of the evaluation of any course.

Another means by which to evaluate course effectiveness is to examine student grades (McFarlin, 2008), although higher grades do not necessarily mean that the student has learned more in a given course. To partially combat this problem, we have attempted to develop formal evaluations (i.e. graded quizzes and exams) that test the students’ ability to apply the information that they have learned rather than merely demonstrating that they have memorized it. Another approach to testing that we have recently begun to use is to provide a similar pre- and post- test that includes a short assessment of the key concepts in the course. If properly designed, such assessments can provide practical information regarding student learning (Dancy & Beichner, 2002). We have designed our pre- and post- test surveys in such a way that we could also administer these at 6- and 12-months after the course is complete in order to assess long-term retention of key concepts. A combination of information collected from assessments is important to the design of effective courses.

Conclusions

In summary, online learning modules can be designed, which are effective at teaching complex material to large undergraduate courses. We have validated our approach in course delivery mechanisms with different levels of students. Specifically, we targeted freshman and sophomores (KIN1252 and KIN1304), as well as juniors and seniors (KIN3306). Lower division courses typically require a different level of content delivery than upper division courses and a major strength of our approach is that we have validated our approach across this range. In general, the examinations in KIN1252 and KIN1304 focused on teaching students basic foundation material, while KIN3306 focused on upper level, advanced applications. This report demonstrates that our approach to the development of online learning modules is well suited for a variety of applications on content levels. It is our expectation that this case report will encourage current health educators to explore the use of online/hybrid learning techniques.

Future work in this area should use factor analysis to determine which aspects of online learning modules provide the most effective boost in academic performance and content retention. More research is needed to understand how learning games can be used to increase learning of both foundation and advanced topics. We are also in the process of use our approach in other courses on the University of Houston campus and when these courses are finished we will complete a systematic analysis of our online course effectiveness.

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References


