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TEACHING IT IN A HYBRID LEARNING ENVIRONMENT
A CASE STUDY

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ABSTRACT

Dakota State University offers a Master's degree in Information Systems to students using what is referred to as a hybrid learning environment, a simultaneous combination of in-class, remote interactive audio/video connections (DDN), and Internet connections. This paper identifies some of the issues and challenges that have been encountered by faculty and students in this teaching environment.

Keywords: Information systems education, Distance education

INTRODUCTION

Communication technology and the proliferation of the Internet have experienced unprecedented growth over the last few years, and as such, have been a driving force behind the popularity of distance education and Internet-based learning across college campuses across the United States. According to the US Department of Education National Center for Education Statistics, 34% of the institutions surveyed (a total of 1600) offered distance education in 1997-98. Overall, 1.7 million students enrolled in all distance education courses offered by two-and four-year institutions, primarily at the undergraduate level.

Hybrid Learning Environments

Nevertheless, distance education comes in different forms and flavor and can be classified along multiple dimensions including type of communication (synchronous versus asynchronous, place, technology, to name a few. Overall, we can define a form of distance education in terms of the learning environment it supports, where a learning environment refers to a particular setting in which learning takes place. Examples of learning environments include a traditional classroom-based environment, a computer assisted instruction, and a virtual learning environment (VLE). In computer aided instruction, students individually enter a self-contained computer-based learning environment with little if any communication among students or between students and the instructor (8). In contrast, Wilson (14) defines VLE as "computer-based environments that are relatively open systems, allowing interactions with the participant". With the advent of the Internet, VLEs usually refer to Internet-based environments that allow for either synchronous or asynchronous communication.

In this paper, we will refer to a hybrid learning environment (HLE), which we define as a classroom- and computer-based environment that is a relatively open system, allowing both synchronous and asynchronous interactions and encounters with other participants.

Objectives of the Paper

In this paper we identify issues and challenges encountered in teaching IT in HLE. Specifically, we are interested in identifying how and why HLE can be an effective learning environment for

teaching information technology curriculum. We accomplish the aforementioned objective by utilizing case study research with the unit of analysis being the Master of Science in Information Systems (MSIS) program at Dakota State University (DSU).

Outline of the Paper

The paper is organized as follows: the next section presents a brief review of the literature with particular emphasis on factors affecting the choice of learning environments and their relationship to learning effectiveness. The following section describes the MSIS program at DSU. Next we present an analysis of the experiences gained utilizing the HLE in the MSIS program at DSU.

LITERATURE REVIEW

The choice and effectiveness of a learning environment is closely intertwined with student characteristics, behavior and social needs. For example, Dumont (3), Brown (1) reported that in an Internet-based environment, a student's first sensation is one of isolation. Ricketts et al. (9) stresses that conversion of traditional practices to electronic practices should be conducted in a manner that reduces the sense of isolation through increased interaction.

Moreover, Pallof and Pratt (7) emphasize student's own behavior in a social setting, with learning becoming more effective when there is interaction between the instructor and the students. Gender-based differences between traditional classroom-based environments and VLE may also exist as reported by Russell (10). Learning style is also another factor to consider. Schellens and Valcke (11) indicate that students who have learning styles that are not favored by the learning environment will experience learning difficulties, and will have lower levels of appreciation for the learning environment. Last, but not least, are maturity and motivation for academic success (6) and the comfort level and attitude towards technology (8).

Faculty motivation, attitude, and comfort with technology also plays an important role in the choice and effectiveness of learning environments. For example, Ferguson and Wijeykumar (4), reports that on average, it took 25 hours to transfer each 6-hour module to an acceptable distance education format. Hlitz (5), also indicates that instructors in a VLE environment feel as if they are "on duty" 24/7. Instructors are further burdened by the lengthy nature of communication and interaction in VLE (12). On the other hand, Webster (13) indicates the relationship between an instructor's: positive attitude toward the technology, teaching style and control over technology, with learning effectiveness. Overall, a reward and support structure in terms of tenure and promotion (2) and the institution of support for course preparation, technical support, release time, and so forth can help instructors adjust to a particular learning environment.

Course specific attributes also affects the choice and effectiveness of learning environments. Picolli (8) indicates that if the course content focus primarily on the transfer of factual knowledge, the CAI environment may be appropriate. However, (24 notes that for contents or designs that emphasize discussion (typical in managerial courses), an environment that promotes communication is required. Other factors for consideration include the degree of discretion that students can exert over the pace, sequence, and contents of instruction, the type of interaction (synchronous vs. asynchronous), and the learning model (objectivist vs. constructivist) (8).

THE MSIS PROGRAM AT DAKOTA STATE UNIVERSITY

This particular case study involves the introduction of Dakota State University's first graduate program, a Master of Science degree in Information Systems. The program requires 30 credit-hours of work, with up to an additional twelve hours of "knowledge" courses required for those students with lacking the necessary business or technical background. The thirty hours of required courses are currently divided into eighteen hours of core courses, nine hours of courses in a selected concentration, and a three-hour project - divided into project planning (1-hour) and project implementation (2-hours). The program offered a choice of three possible concentrations. The capstone IS project requires the planning and implementation of an actual IS project.

The program current has 96 students enrolled. Of those, approximately 35.7 percent are in-class students, 31.6 percent take courses over the DDN (Dakota Digital Network), and the remaining 32.7 percent are Internet students (although these figures are somewhat fluid, i.e. some student move back-and-forth between categories depending upon the course and semester).

Development of the Hybrid Delivery Model

MSIS courses are now taught as in-class courses using the on-campus DDN classroom/studio, as remote sites using remote DDN classrooms, and live and/or video-streamed via the Internet to nineteen other states. In addition, students may enroll in the courses as Internet-only students, taking the courses asynchronously over the Internet. These students can still watch the classes, which are recorded digitally, via Real Player. Thus, although they are in the same course as in-class and DDN students, they are considered VLE students.

Multiple Format Delivery System

This combination of students has fostered a multiple format delivery system, which will be illustrated through the description of INFS 601: IT Hardware and Software Concepts, a course taught by one of the authors. This class has several delivery methods in use. First is the in-class presentation and discussion segment, which takes place between and among the instructor and students. Students in the classroom or on the DDN interact as they normally would in a class, while the Internet students watch the live video streamed class can call in with questions (there is a telephone available in the studio). But unlike traditional classes, all MSIS classes supplement in-class material with additional material and coverage using both synchronous and asynchronous methods. The 601 course has a course web site that provides students with access to supplemental explanations on various topics, details graded assignments, and gives access to videos of all of the classes.

In addition to the web page, there is a course WebBoard, which is like a course bulletin board. The instructor can post messages to students and students can exchange ideas and ask and/or answer questions by posting messages in labeled conferences. The instructor also communicates with students via email, the telephone, typed or audio chats using NetMeeting or Digichat, etc. They can also take exams using the online Quiz Center and view their course grades using the online GradeBook. In addition, some instructional material posted to the web site takes advantage of narrated PowerPoint and Excel exercises. Thus, the course truly uses multiple delivery formats.

ISSUES AND CHALLENGES

Types of Courses

In DSU's MSIS program, there are four types of courses: knowledge support courses (required only of students who do not meet specific admission knowledge requirements), information systems core courses (required of all students), an integration project (required of all students), and specialization courses. Some of the courses are technical, some are managerial/ organizational/behavioral, and some are mixed. While each course has its unique characteristics and poses some challenges to the instructor and students involved, we feel some courses may be less suitable in a mixed environment and thus more difficult to teach using mixed-delivery method. We especially think that the more technical courses and course requiring a hands-on experience are more difficult to teach using mixed-delivery method.

Class Participation

We believe that a mixed-delivery method change the dynamics of the classroom dramatically. While the on-campus students and students at remote sites can participate verbally in the class, it is difficult for Internet students to join in because of time and the inconvenience of calling in during the class. We found that less material (probably 20%) can be covered in a class compared with teaching in a classroom only setting and thus more materials (e.g. examples/cases) must be posted and more discussions must be conducted in the course webboard or in email. While it is less efficient/effective for students to participate in a typical managerial course, it is more difficult for an instructor to convey the idea or to explain the topic in a technical course.

Office Hours

We maintain adequate office hours (about 10hours/week) during the day. We also hold virtually office hours (typically two times a week, 3 hour each time) to accommodate the needs/requirements of remote students and Internet students. Distance students can communicate with the instructors via email, phone (we provide toll-free number), or Internet chat rooms.

Teaching Load and Instructor Performance Issues

Two courses in the MSIS program are currently offered though the Internet only. The majority of courses are offered using the mixed-delivery method. With the mixed-delivery method, each class consists of students on campus, students at remote sites in different DDN locations, and Internet students. We feel that overall, teaching a course using mixed-delivery method is much more demanding and time-consuming than teaching a course in a traditional classroom setting. Remote and Internet students sometimes expect that an instructor will be online all the time, and therefore be able to answer email and provide feedback for homework, exams, and projects immediately. They also expect the instructor to participate in and mediate the threaded discussions, as well as to provide answers to question posted in the course webboard in a very timely fashion. The lack of face-to-face interaction with the instructor for remote students and Internet students, combined with the occasional low quality of audio and video, etc. may also cause frustration among students and affect the effectiveness of the communication process. The results thus far seem to indicate that the performance evaluations for instructors using a mixed-delivery method are less favorable when compared with their evaluations in a traditional classroom setting.

Hardware and Software Requirements

It is required that every student has a computer in which the student can have full control and add/remove hardware/software freely. Because of academic license agreements, we are able to provide some software (e.g., Visual BASIC.NET) to students to use. Students, however, have to purchase selected software for use in some courses, although we try to use open source software wherever possible. In addition, some software has special license requirement and make it complicated or inconvenient to use remotely. Some software, such as ASP.NET, also requires that VB.NET and the server software work together, posing additional challenges for students.

Lab and Hands-on Requirements

While it is possible for students to take some courses without lab work on campus or for students to conduct lab work at home or at their place of work, it is essential for students to have hand-on experiences in some specific courses (such as networking). For that reason, we currently require remote students and Internet students (without access to the necessary equipment) to come to campus for a weekend lab experience. This puts both a time and financial burden on those students. In some cases, we may be able to substitute simulation packages for the lab experience.

Administering Exams

Since Internet students and students at remote sites usually cannot come to campus to take the exams, an efficient, effective and fair way to administrate the exam is needed. We have tried different methods with mixed success. In some cases, an open-book exam is made available to students. Students complete the exam and return it before a deadline. One disadvantage of this approach is the possibility of collaboration (cheating). The use of proctors eliminates this problem, but some students have difficulty finding a proctor for a particular time or day. In those cases, the instructor is often flexible, but this delays providing students with feedback.

Projects

The MSIS program emphasizes a balance between theory and hands-on experiences, technical versus managerial knowledge (although we lean strongly toward the technical side) and an integrated approach in our curriculum design. The students are required to complete an IT implementation project and to write a comprehensive report detailing what they did and how they accomplished it. They then make an oral presentation on their project. While almost all remote students and Internet students have full-time jobs and often choose job-related projects, one problem we face is that it is not always easy to find a meaningful project for students on campus and for students who have full-time jobs, but can not choose an in-house project. We are exploring alternatives such as demonstration projects and research theses.

While most students come to campus to make their presentations (which are open to the public and videotaped for later video-streaming) and defend their project/thesis, some students present from remote locations. Various software and hardware have used in the past with mixed results. We suggest that a very limited number of choices that are widely used and readily available be used in order to reduce the burden for the technical support staff and to ensure the quality of presentation. If a student is located within South Dakota, DDN rooms should be used. Remote students can also use a local Kinkos to connect to the DDN.

Library and Other Sources

The distance students have full access to all the resources available in DSU library. The DSU library posts a guide entitled "Library Services and Resources for E-Education and USDSU" on its web site with many easy to follow tutorials, guides and other instruction materials available online for all students. The library also sends the document in both PDF and word format to the instructors before the start of each semester for distribution to all distance students. All distance students are entitled to library services and resources equivalent to those provided for students and faculty in traditional campus settings and the DSU library is committed to provide the same level of service and resources to distance students that they do for students on campus. Distance students are given special accounts so that they can get access to online resources from the DSU Library. Distance students also have access to reference services. The librarians are available to help all students locate information and/or direct them to the appropriate resources for students' needs. Distance students can send their request for research/reference help via email or telephone. Working together with two other universities, the DSU library also offers "Chat with librarians – LIVE" to all students.

Distance students can also use a database-searching service. When one of the library's electronic information services is not accessible to a distance student, a librarian will do the search and provide a list of citations to journal articles, books, or other materials. The student may then select items from the list and the library will send them to the student. The library also provides Document Delivery & Interlibrary Loan to distance students.

The library delivers materials to distance students in support of their academic program needs. Materials include articles from magazines, newspapers, journals, and reference sources. Most of the articles are sent by email as a PDF attachment; in some cases photocopied articles are mailed at no charge. The materials may also be books and other materials. If the DSU library does not own an item, the library can usually borrow it from another library through the Interlibrary Loan Service. A student pays only the cost of returning the item; the library pays all other document and book delivery costs. Since the library cannot guarantee an exact delivery time, a student has to plan ahead and request help and services early.

Distance students can also get information from other channels as well. For example, they can get online sources provided by the instructors, online sources provided/shared by other students in the class, or search for and use online sources themselves. After looking at the resources and services available to distance students, we feel that three problems have sometimes occurred:

- Information overload: students are overwhelmed by too many resources and at the same time, and find it hard to select the truly relevant information.

- A reluctance to use printed materials and/or full context references. It seems that students tend to use materials available online more because they can easily search for those reference materials using available search engines. This seems to occur because students are not sure if and when the requested materials will arrive, the cost of returning the items, and the time required to find and order the items.

- Students use materials from web sites without really evaluating their quality or accuracy. It is not uncommon for students to list the benefits of using a Microsoft product and cite Microsoft.com as their reference.

DISCUSSION AND CONCLUSIONS

The authors are currently in the process of evaluating the effectiveness of these various delivery methods, both in terms of student satisfaction and in terms of student performance. Early evidence suggests that in-class students have higher levels of satisfaction and feel it is easier to learn the material. In fact, some students who have access to DDN delivery prefer to drive to campus to attend the class. However, other students who could come to class chose to take the course via the Internet, citing the greater flexibility offered by that alternative. This evaluation is currently in its early stages. Measurement instruments are being revised and the number of courses that will be evaluated will be increased.

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