UNDERGRADUATE NURSING RESEARCH AND THE WEB
AN INTERACTION EFFECT

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Abstract

Electronic technology and technology-mediated education (TME) have collectively become the quintessential monad of modern academe –both in the United States and around the globe. With this proclivity for educational "progress", education has become both transnational and transactional. Students enroll in courses with students from around the world; scientists readily share their knowledge and research with colleagues in other countries; health care experts provide consultations and treat patients through distance technology; and ordinary citizens have access to a myriad of information on the Internet. The impact of this new technology is particularly evident in health care where students must not only become proficient with the methodologies in their courses, but must actually use many of them in their professional practices. This challenges the traditional infrastructure and modalities of education.

Nursing research and technology-mediated education seem to interact quite effectively with one another. The question remaining is whether this interaction will continue over time and whether students of this process will become practicing nurses who can effectively utilize nursing research. Changes founded on technology are inevitable, but the outcomes will determine whether the changes were based on experience and wisdom, or the need to be electronically fashionable. Someday, our students will tell us.

KEYWORDS: Nursing research, nursing education, web, Internet

INTRODUCTION

Electronic technology and technology-mediated education (TME) have collectively become the quintessential monad of modern academe –both in the United States and across the globe. With this proclivity for educational "progress", education has become both transnational and transactional. Students enroll in courses with students from around the world; scientists readily share their knowledge and research with colleagues in other countries; health care experts provide consultations and treat patients through distance technology; and ordinary citizens have access to a myriad of information on the Internet. The impact of this new technology is particularly evident in health care where students must not only become proficient with the methodologies in their courses, but must actually use many of them in their professional practices. The “classroom” has changed and will now be forever changing. Health care students take two-way synchronous audiovisual courses, online courses, traditional on-site courses, and
a combination of all three. They communicate with their faculty by e-mail, in chat rooms, by simultaneous audiovisual transmissions between their homes and faculty offices, do numerous types of research online, and locate required articles through electronic library reserves. Nursing students study “virtual” anatomy and physiology. They are observed in the clinical settings by faculty located in their offices or other clinical settings, and send patient/client information directly to faculty and appropriate agency professionals for expert interpretation. The “virtual university” is virtually everywhere and available to many students who previously would not have been able to enroll in, or even have had access to, college level courses.

All of this is not without problems and risks, however. Pedagogical and philosophical debates continue on the efficacy of utilizing “electronic neurons” to transmit information and excite students in caring professions. From a more pragmatic perspective, there are frequently technical and educative malfunctions: software incompatibilities, electrical outages, server and computer failures, and sometimes a lack of knowledge and skills by the participants, and even unknowing observers. This electronic medium has spawned passionate criticism resulting from the daunting lack of one-on-one interpersonal interactions among students and their mentors - something ascribed to by scholars since the time of Socrates. There is yet much to be learned about the long-term impact of this new type of learning and how it will provide students with adequate life-career opportunities – the knowledge and skills requisite for productive employment and ultimately for employer and personal, self satisfaction.

There is equally as much to be learned about the appropriateness of electronic technology for any given course or class. Hall [2000] stresses that technology should support what is going on in the classroom, not determine it. Before relying heavily on the use of technology, consideration needs to be given to hardware available, software to be used, availability of technical support, and the philosophy of the institution or school. In addition, the needs and interests of faculty have to be considered. Not all coursework and not all faculty are well suited for TME. Using electronic technology cannot only demand the need for learning by the faculty, but pervasive use of these techniques can be extremely time-consuming. Online and two-way courses consume much more time than the traditional lecture in the classroom. Additionally, some students do not learn well by these methods, and from a financial and administrative perspective, the hardware and facilities are phenomenally expensive [Rosenkoetter, 1998].

Education remains the ultimate goal. Ensuring a quality education, utilizing available technology without compromising the objectives, and at the same time safeguarding the welfare of both students and faculty is once again the challenge. Undergraduate and graduate nursing research courses have been found to be particularly adaptable to this new medium, perhaps because of the structured and objective nature of the content, but perhaps more importantly, because dedicated nursing faculty have been diligent in making them successful. Determining how to use the available technology, the extent of its use and for what purposes, requires intensive deliberation and considerable foresight – and a crystal ball with perspective!

BACKGROUND AND RELATED LITERATURE

In recent years, a number of organizations have established standards for electronic education, online learning, and distance education. The Western Cooperative for Educational Telecommunications published “Principles of Good Practice for Electronically Offered Academic Degree and Certificate Programs” [WCET]. Some of their principles included that “Each program of study results in learning outcomes appropriate to the rigor and breadth of the degree or certificate awarded” and that it is “coherent and complete”. “The program [should provide] for appropriate real-time or delayed interaction between faculty and students and among students.” The latter, of course can be met in a number of ways, including teleconferencing, chat rooms, one-on-one interactions and on-campus time. This laid the foundation for what became the “Best Practices for Electronically Offered Degree and Certificate Programs” and made available through the North Central Association Commission on Institutions of Higher Education [NCA, 2000]. This document focuses on commitments to traditions, values, principles, cooperation, consistency, collaboration, and the support of good practice. It reinforces the need for a community of learning, the dynamic and interactive nature of learning, and the responsibility of institutions for the quality of the curricula that they offer. The Institute for Higher Education Policy [IHEP, 2000] provides benchmarks for Internet-based distance education. Some are not essential for quality, while others certainly are. The latter includes such things as electronic security measures, reliability of the electronic systems, minimum standards for courses, interaction between faculty and students, student
access and understanding of relevant information, and faculty support throughout the development and teaching processes. Olson & Shershneva [2004] provide a comparison of several of the existing standards set forth by a number of these organizations. They suggest that “The standards should take into account the purpose of the program, consider the interests of key stakeholders, recognize the wealth of knowledge that can be gained from experienced Web educators and the growing body of research, and give attention to the four key areas of learner, teacher, curriculum, and context.”

Technology mediated education, is being increasingly used in a variety of curricula and disciplines; however, the type of technology and the actual uses can vary considerably from one course to another and from one institution to another. Kuzma [1998] used the Web successfully in teaching a course in international relations. The author makes the point that technology is not an end in itself, but rather a means. “…the web is an educational tool that is uniquely suited to advance student-centered learning and develop student’s cognitive skills. By making vast amounts of resources highly accessible, it allows learners to become skilled at evaluating and integrating information, which, in turn, enhances their critical thinking abilities” [Kuzma, 1998]. In this particular project, students were asked to create a well-designed total Web site on a topic of their choice appropriate for the course. To facilitate the process, they were given instructions on Web site design. They not only had to know Web site design, but they needed a thorough understanding of their topics in order to present them successfully in this format.

In another course in political science, namely an introductory course in American Government, Garson [1998] replaced lectures, library research and classroom attendance with an online workbook and readings, electronic discussion groups, and e-mail for advisement. Yet, a print textbook and an offline midterm and final with structured and essay items, as well as a writing assignment were also used. The author suggests that a mix of traditional and online offerings was most recommended, rather than replacing everything in the course with electronic instruction. Following a study of the introduction of a Web component into a general biology course, the researchers suggest that the Web could be used for posting course syllabi, student grades, quizzes, and components that encourage student-to-student as well as student-to-faculty interactions. “The materials posted to the Web should address the different learning styles of the students and be diverse and interesting enough to encourage student participation” [Sanders, & Morrison-Shetlar, 2001]. In another course, however, an entire German writing course was structured around the online experience, as a total replacement course, and not just an attempt just to replicate a traditional course online [Lohr, 2001].

Tyler [2001] provides an extensive survey of online courses in library and information science. The author further comments on the difficulties associated with such a survey on the topic because the terminology varies so greatly, and especially across countries worldwide. A number of issues are examined by the author which impact on the success of such courses, including the types of courses offered, course characteristics, Web site characteristics, technical issues, perceptions, the market and various problems associated with this type of course offerings. Included are issues which need to be considered before actually offering online courses:

- equity of access
- cost of program development and implementation
- accreditation and quality assurance
- copyright and intellectual property rights
- changing roles of department staff
- pressures on existing organizational structures
- information technology training
- suitability of the Internet as a learning tool [Tyler, 2001].

**EDUCATION AND NURSING RESEARCH**

Health care disciplines have dramatically increased their use of electronic technology in the classroom over the past few years. The reasons vary, but many include the need to reach students in geographically remote locations, to encourage students to return to school for further education when they have home and family responsibilities, and to increase the number of graduates who can meet the ever-increasing population demands for health care services. These trends have been especially true in nursing education where there is a serious shortage of both registered nurses and registered nurse faculty.
In an article on "Internet Teaching Methods for Use in Baccalaureate Nursing Education (2004), Chaffin and Maddux provide an overview of approaches that have been used in nursing education, both at the undergraduate and graduate levels. They describe the issues involved in technological competence, rigor and quality, expanded learning, and student and patient teaching. Creativity and the wise use of resources seem critical to the success of any of these innovative programs. Considerable success has nevertheless been demonstrated in teaching nursing theory, critical thinking, various clinical skills and facilitating international collaboration and research. One of the problems, however, is assisting faculty and students to acquire the skills needed to use the extant technologies. In one study [Christianson, Tiene, & Luft, 2002] it was found that over 80% of the 171 faculty studied indicated that they spent more time planning and implementing a Web course than they did for traditional courses, and yet many preferred this format for instruction. Such things as Web site down times and Internet problems can significantly impact on the workload of students and faculty [Hayward, 2003] and add to confusion. Typically the problems that are encountered are the extensive amount of time it takes to prepare an online course, technical problems, unfamiliarity of students with the technology and, for off-campus students, unfamiliarity with campus resources [Willis, Stommel, & Simmons, 2001].

Nursing research courses are taught utilizing traditional approaches, two-way synchronous technology, Web-based technology and a combination of these. One of the motivating factors for online courses has been the need to provide baccalaureate level nursing education to graduates from associate degree and diploma nursing programs as a move toward achieving professional practice status. By using online and two-way synchronous courses, these students can remain in their own communities, continue to work, and continue to be a part of their families while pursuing further education [Rosenkoetter, 1998; Rosenkoetter & Howard-Vital, 1998]. "Teaching undergraduate research via a web-based course is not only possible but desirable for the RN/BSN student. The results of two years of using this modality have been positive for both students and faculty, although not without challenges" [Cox, 2002]. In a comparison of student satisfaction scores among graduate nursing research students, it was found that there were no significant differences in either test scores or overall course satisfaction for students who took the course via the Internet with those who took the traditional course [Woo & Kimmick, 2000]. In a similar study, there were also no significant differences in examination scores for students who took an undergraduate research course taught via the Web versus via traditional approaches. Those students who reported that they were self-directed, could work at their own pace, and did not procrastinate were perceived to be the most suited for the Web-base course [Leasure, Davis, & Thievon, 2000].

Critical thinking is another issue of intense interest among nurse educators and is increasingly the focus of courses utilizing Web-based instruction. It is fundamental to nursing research as well as professional practice. In one study of undergraduate nursing students, the California Critical Thinking Cognitive Skills Test was used to compare students’ critical thinking ability. It was found that those who participated in computer technology activities scored slightly higher than those who were enrolled in courses using other forms of instruction [Kowalski & Louis, 2000]. In another program, problem-solving situations with critical-thinking components were integrated into an introductory clinical nursing course through electronic conferencing. Both students and faculty reported positive outcomes [Witucki, Hodson, & Malm, 1996]. These approaches reflect what is sometimes referred to as hybrid courses because they integrate technology into classrooms that also utilize more traditional approaches. Time that is more traditionally spent in classroom instruction is reduced but not totally eliminated [Mueggenburg, 2003]. Moving students into this form of technology is becoming increasingly easier due to the amount of technical competence that students are now bringing to the educational setting, yet there remain those obstacles to be overcome such as fear of the technology, downtimes, and the expense of equipment and software. Not all students own or have access to a computer except in the university or college setting.

There are a number of approaches that faculty can use in the development of technology-based courses. Among them include software that facilitates the development of online courses. During the past few years not only have a number of commercial products been made available, but open sourcing has become increasingly popular. The cost of using commercially made software has become prohibitive for some institutions with licensing agreements costing thousands and even hundreds of thousands of dollars. "Hundreds of colleges ...[have] joined one or more of the many open-source software projects that have emerged in recent years. Unlike proprietary commercial software, which is usually owned and controlled by a single company, anyone can use or alter open-source software" [Young, 2004]. Examples include Moodle and Sakai that have software packages that assist faculty in building websites. Commercial sources include Blackboard, eCollege, and WebCt, as some of the largest.
At the Medical College of Georgia (MCG) the undergraduate nursing research course is an online course utilizing the electronic technology of WebCT, a software application that permits faculty to develop and manage fully integrated Web courses in any discipline. It has a wide variety of features and wizards that make it possible for faculty to create course syllabi, a Bulletin Board for the course, student quizzes, study guides and printable handouts, and chat rooms to mention a few [http://www.webct.com; Buhmann, 2000]. Students can have access to all authorized areas, communicate with one another as well as with faculty, complete examinations, discuss cases, and turn in assignments. Faculty can track student progress, return papers, give quizzes, and provide timely feedback.

The MCG Web site includes icons for the Syllabus, Content Modules, Assignments and Deadlines, Student Tools, a Calendar, and Quizzes. A number of the content modules are in PowerPoint presentation format, with learning exercises, and links to nursing sites of interest. Research has not yet been completed on student satisfaction in the course, however, overall course evaluations are certainly above average. Problems with the course include the usual downtime problems, student unfamiliarity with some of the technology, and home access. Because students in this course are located in two different geographic locations (cities), there are some special considerations. Faculty are assigned in both locations to assist with the course and to meet with students when the need arises. With over 150 students enrolled, it was determined that providing faculty with a hard copy of the research article critique would simply grading and prevent 150 e-mails or postings. This is facilitated through POTS, or traditional mail service.

**DESIGN, IMPLEMENTATION, AND EVALUATION**

When faculty are considering offering an online, hybrid online, or even a two-way synchronous course, there are a number of factors to take into consideration before beginning the design and implementation processes [Rosenkoetter & Howard-Vital, 1998]. Perhaps some of the most important are: 1) the objectives of the course; 2) availability of resources; and 3) the electronic technology knowledge and skills of faculty and students. Just because individuals are acquainted with computers does not mean that they are proficient, or even familiar with, the software that will be required in an online course. Short-term courses may be needed for faculty, and orientation programs for students. These needs may actually be ongoing until everyone is comfortable. When a new class is admitted the orientation begins once again.

Consideration needs to be given to the suitability of offering the course online in contrast to the traditional classroom or laboratory setting, and furthermore, whether the course can be offered as substantially the same course, or if it will require a total new restructuring. Given that online courses require an inordinate amount of time to create, and given that teaching online can require much more time than in traditional settings, faculty need to be thinking about what impact this will have on their own time commitments. The adequacy of resources can not be over stressed because there is a critical need for personnel support, hardware, software, and an effective working relationship with the people who handle the crises. And crises will indeed occur. Power will fail, university servers will do down, student computers will get a virus or quit working, and there will be panicky students when papers or assignments are overdue during malfunctions. Students are well convinced that there is a tiny lagomorph that mysteriously digs its way into their computers and gnaws on the motherboard! Hence, late papers.

An online or two-way synchronous course will need to be given a “dry run” before actually being taught in order to determine the various components that are not working. Faculty should understand that links will fail, glitches will occur, and pages will not open – even after the course has begun! Materials on the Web site need to be sufficiently understandable that students can read and complete assignments without much faculty interaction. The more e-mail and chat room questions, the more faculty time that is absorbed. Clearly delineating the roles and responsibilities of faculty and students can facilitate progress. As students develop support groups among classmate, they can many times find the resources to answer their own questions. When, however, students feel depersonalized, left on their own, and have little or no personal interaction with faculty and students, they can become distressed and discouraged. This can be a learning disaster.

Following a prescribed pattern of decision-making can be of considerable assistance when establishing an electronic, online, or any TME course. The following flow chart demonstrates one such option.
Faculty need to begin by making certain that electronic technology and online courses are endorsed in the mission of the university, college, or school. Otherwise, sufficient resources of all types may not be available to support such endeavors. The next task is to identify the course, the purpose and objectives, and the content to determine if these are adaptable to this type of medium. Again, not all courses or all faculty will be appropriate, but it is better to determine this at the outset rather than after considerable time and resources have been expended. All resources need to be carefully considered, from staff to facilities and hardware to faculty [Rosenkoetter, 1998]. Then developing a time framework is essential and needs to include each conceivable element, with the understanding that modifications will need to be made as progress is made. Training begins with the staff because it is these people who will train the faculty, who in turn will orient the students. As implementation begins, the entire process is revisited and changes made as necessary. Through evaluation, problems can be identified and rectified before the course is once again brought online. Typically, the evaluation plan includes all aspects of the course and the entire process, including tracing it back to the mission of the institution. Input from staff, students and faculty is essential if administrators are to have sufficient information on which to base logistic and financial decisions.

CONCLUSIONS

Undergraduate nursing research and the Web – an interaction effect? Perhaps. It certainly seems to be working. What have we learned? We have learned that there are technical problems, necessary planning strategies, learning and teaching needs to be met, and most of all, that there are challenges to the traditional infrastructure and modalities of education. Yet, these two creatures of evolution – nursing research and technology mediated education – seem to interact quite effectively with one another. The question remaining is whether this interaction will continue over time and whether students of this process will become practicing nurses who can effectively utilize nursing research. Changes founded on technology are inevitable, but the outcomes will determine whether the changes were based on experience and wisdom, or the need to be electronically fashionable. Someday, our students will tell us.

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