The demands of a dynamic health care environment have altered the roles and responsibilities of nurses, creating employment situations where distinctions across educational levels are becoming increasingly important. The 1995 Pew Foundation Report projected that, in the next decade, there would exist a shortage of registered nurses with baccalaureate and higher degree preparation. This deficit creates a unique opportunity to provide innovative approaches to career mobility for registered nurses. Constraints related to juggling the demands of home life, child rearing, and employment have been obstacles for diploma and associate degree nurses wishing to continue their education. Web-based instruction offers exciting possibilities for a new paradigm in nursing education that takes advantage of both the interactivity and substantial resources of the Internet. On-line registered nurse completion programs offer flexible, cost-effective, and easily accessible alternatives to traditional education. This article describes the application of adult learning theory for use in re-engineering courses for on-line instruction. Hardware and software needs, technical support, development of an instructional model, teaching-learning considerations, and program evaluation also are discussed. (Key words: Career mobility for registered nurses; Distributed education; Nursing education; Web-based instruction)

Historical Perspective

Historically, a dispute over minimum educational preparation for nurses has been plagued by internal divisiveness resulting in erosion of nursing solidarity. The 1965 American Nurses Association proposal to require baccalaureate education for all professional nurses, intended to enhance the level of patient care and to improve the status of nursing, created an internal schism within the profession. The retraction of this position, before the 1985 implementation date, left the issue unresolved. Although many registered nurses desire to earn a bachelor of science in nursing (BSN), they must overcome obstacles that seem insurmountable. This article proposes a timely approach for nursing to capitalize on the advent of the information age to elevate the status of its practitioners and the profession.

Each type of educational program was revolutionary in its time. Diploma programs represented the first efforts of the profession to formalize nursing education and to upgrade nursing practice. Existing as the sole educational preparation for nurses at the turn of the century, these programs trained nurses using a service-oriented, apprenticeship-type model within hospitals and were largely controlled by medicine.

The need for increased depth and breadth of knowledge for nursing practice was recognized as early as 1923 in the Goldmark Report. The advent of baccalaureate nursing programs represented an effort to promote autonomy and advance the professional status of nursing. Nursing was one of the earliest educational programs to combine the broad-based knowledge gained in baccalaureate education with specific knowledge and skills required for students to perform as entry-level professionals within their field.

Finally, associate degree nursing (ADN) education was added to the mix. At its inception, the purpose of ADN programs was to prepare graduates to function
in structured practice settings providing care for patients with common, uncomplicated conditions. In reality, graduates were hired for the same roles as registered nurses with other types of preparation. The North American Society, led by state boards of higher education, recommended moving away from a 2-year education as a terminal degree toward articulation with 4-year programs (Matthews & Travis, 1994).

Although less direct attention has been focused on this conflict today, nurses continue to argue about the superiority of one type of educational preparation over another. Recently, the demands of a dynamic health care environment have altered roles and responsibilities of nurses, creating employment situations where the distinctions across the educational levels are becoming increasingly important. Forces external to nursing are recognizing the value of higher education for nurses. This awareness has created an increased demand for baccalaureate-prepared nurses. The most efficient method for meeting this current high demand is to develop effective methods to foster career advancement within the existing nursing work force.

Needs Assessment

Nationally, the number of nurses graduating from diploma and associate-degree programs in 1995 exceeded graduates with baccalaureate degrees by a 3-to-1 ratio (“Trends in contemporary nursing education,” 1996). Furthermore, this ratio has remained relatively constant since 1975. A Pew Foundation report (1995) projected that, in the next decade there will be a surplus of nurses with associate degrees and a shortage of nurses with baccalaureate and higher degrees. The health care industry continues to seek new ways to provide cost-effective care despite rising levels of inpatient comorbidity and acuity. Increasingly, care is being provided in the community, home, or ambulatory settings. Consequently, the role of the nurse is evolving. Primary care nursing has virtually disappeared, replaced by interdisciplinary managed care and case management. Hospital staffing patterns have reverted to use of lower-salaried, unlicensed, assistive personnel and licensed practical nurses working under the direction of registered nurses. Meeting patient needs in this environment demands that nurses are skillful in supervision, delegation, conflict resolution, autonomous clinical judgment, collaboration, and interdisciplinary practice. New practice settings, especially in the community, require expertise in communicating across disciplines as well as education of patients and their families within an increasingly diversified population. At no other time in history has nursing been more challenged to produce autonomous practitioners with excellent critical thinking and creative problem-solving abilities. These abilities are essential if nurses are to assume a central role in the provision of cost-effective, high-quality patient care.

The National Advisory Council on Nurse Education and Practice ([NACNEP], 1996) noted that baccalaureate education—with its broader, more scientific curriculum—best fulfills these requirements and provides a sound foundation for a variety of nursing positions. In accord with these expectations, the Division of Nursing (NACNEP, 1996) supported increased enrollment in professional nursing programs. Yet, only 31 per cent of recent graduates received their initial education in a baccalaureate program (NACNEP, 1996). Furthermore, NACNEP projections for 2020 indicated that 775,000 additional nurses will be needed in more diverse roles. If the supply of nurses with appropriate educational preparation (ie, baccalaureate degrees) is to be achieved, educators need to provide reasonable ways to foster career mobility within the existing work force.

Registered nurses represent a nontraditional population of learners. They are part of an ever-growing group of consumers whose needs and constraints are vastly different from that of the high school graduate enrolling in a university. The typical RN student is older, female, works full-time, and attends school part time (Mathews & Travis, 1994; Sullivan, 1997). Aslanian (1997) noted that adult students return to college with the desire to gain new competencies to enter, maintain, change, or advance in their careers. Constraints to their progress include juggling demands of home life, child rearing, employment, and continued education. Adults are studying day and evening, full time and part time. Flexibility is a key issue to educational access for this population.

Although the historic security of hospital nursing positions is diminishing, requirements for the BSN degree for career advancement or to obtain alternative nursing roles is increasing. Yet, educational access remains an obstacle. Nurses in rural settings are often placebound. Moving and securing a nursing position close to a nursing program may not be an option. With dual-family income emerging as a norm in our society, economic responsibilities may prohibit leaving work to pursue education on a full-time basis. Universities have attempted to respond to this need by
providing flexibly scheduled programs requiring only 1 or 2 days attendance or weekend options. Nurses' work schedules are subject to rotation and variable days off, which result in demands for an endless array of flexible options to meet the needs of this population.

Internet technology provides exciting solutions to issues of access, cost, and flexibility. "The World Wide Web puts a plethora of information at the fingertips of the instructor and the learner and creates an information-rich environment for teaching and learning unlike any other in the past" (Saba, 1998a). Today, technology is available to provide quality education at a reasonable cost. The traditional university approach to the education of RNs is antiquated. Sullivan (1997) noted that approximately half of the student population in universities desire flexible schedules that enable them to continue to work, raise families, and advance their education. Students in RN completion programs have been making this plea for years.

Innovative programs that enable registered nurses to earn a BSN degree through distributed education via the Internet are needed. Current on-line courses can be located using the Internet search engines and typing in key words such as "distance learning," "distributed education," "Web-based instruction," "on-line courses," and the "nursing." Results of these searches often lead to comprehensive sites listing on-line courses, such as World Lecture Hall (www.utexas.edu/world/lecture) and Globewide Network Academy (www.gnacademy.org). University Web sites also provide information about on-line courses within their institutions. Providing greater numbers of baccalaureate-prepared nurses will positively impact the quality of patient care and move the nation closer to meeting the goals established in Healthy People 2000 (1990).

Finally, baccalaureate education provides the foundation for master's and doctoral study. Nurses prepared for advanced practice roles, such as clinical nurse specialists and primary care providers, are needed. Registered nurses returning to complete their bachelor's degree frequently continue their education and complete more advanced degrees. In March 1996, The US Public Health Service Division of Nursing reported that 49.6 percent of RNs with nursing-related master's or doctoral degrees received their basic education in associate-degree or diploma programs (Moses, 1996). The need for advanced practice nurses in primary care is increasing and is expected to improve health care access for underserved populations. Certainly, nurses who have already established a residence in an underserved area offer the most probable group of practitioners to reciprocate by providing care at higher levels and in nontraditional roles.

**Distributed Education via the Internet**

Historically, distance education has been provided by television satellite, resulting in the Internet being an underused media. Internet and Web-based courses are cost-effective, reliable, and easily accessible. Providing distributed education via the Internet has several advantages (Jafari, 1997). The Internet can be accessed anywhere—at home, at work, at a library, or at a university, in either rural or urban settings, at any time, night or day, thus offering unlimited flexibility in scheduling. This medium also conveys video and sound better than a book, is more interactive than a videotape, and, unlike a CD-ROM, can link people from around the world cheaply. It is also the largest and most diverse information resource in the world today (McManus, 1997). By using the Internet to deliver distributed education for nurses completing their BSN degree, the obstacle of access to quality instruction can be overcome.

Another advantage of using the Internet for distributed education is cost effective. Because the majority of nurses have access at home or at work, the teaching media is already present. To provide distance education by television, universities must invest in satellites, classroom facilities for broadcasting, and classrooms for receiving the broadcast. In addition, site coordinators must be hired. Buying and maintaining this equipment along with salaries for coordinators is very expensive. Initially, with Web-based courses, more faculty time and a variety of expertise is needed to create effective, interactive courses. In the long run, it is possible to serve more students, making the Internet media cost-effective for program delivery.

The Internet can provide a more interactive media for distributed education than television. Television distance-education programs usually show faculty teaching; the student sits passively watching the television. In contrast, the student taking courses on the Internet interacts with other students, the faculty, and literally all the resources in the world accessible by Internet. Because health care knowledge and health care delivery systems change so rapidly, it is essential that nurses have the most current information to solve complex clinical problems. Students value the interac-
tion with other class members in chat rooms and in discussion groups. This interaction among colleagues establishes an important foundation for collaborative team building.

In December 1998, Ziff-Davis Technology User Profile reported that there are 60 million personal computers (PCs) connected to the Internet in the United States (Ziff-Davis, 1998). The Internet has become a vast global network with an unprecedented opportunity for exchange of information between homes, universities, libraries, health care institutions, businesses, and other educational resources. Nearly 1,000 new on-line sites are going up every day (Gray, 1998). “While 24 million workplace computers are connected to the Internet, home PC’s represent the lion’s share of the market, with 28 million consumer PC’s hooked to the Internet” (Ziff-Davis, 1998, p. 1). Competition among Internet providers has resulted in monthly access rates as low as $10/mo. Internet access to on-line, Web-based instructional programs is not only affordable for RNs, it is also economical because students attending traditional university classes typically spend in excess of $10/mo for travel, parking, and child care expenses.

Because many people are visual learners, Web video can enhance learning through visualization of information. Web video is practical, productive, and here now. Early efforts, like the first QuickTime movies, were postage stamp-size curiosities, but second- and third-generation video streamers deliver semireasonable results at 28.8K bps and top-quality full-screen MPEG (moving picture experts group) over local area or broadband wide area networks (Avgerakis and Waring, 1997). Video files are often too large to run in real time. Streaming video servers send video to the desktop continuously without downloading the entire file to the hard disk first, saving user time. The file can contain both audio and video. One major obstacle in Web video has been incompatibility of file types and players. However, Microsoft (Redmond, WA) has assimilated its competition’s technology and will be supporting active streaming format in all of its Web video products. A T1 line, fiber-optic networking and 100-Mb fast ethernet capability are essential to deliver high-level technologies such as audio and video streaming. Streaming-media technology is a cost-effective means to disseminate critical information in a way that preserves an element of personal contact (Campbell, 1998).

In re-engineering courses, streaming allows lectures—or other multimedia content, such as vignettes, case studies, or interviews with experts—to be videotaped and sent directly from a Web site. Full-motion video and audio information provided through streaming technology is the most powerful form of communication next to person-to-person (Campbell, 1998). Unlike traditional classroom lectures, streaming allows students to pause a lecture to take notes, move back in the lecture to review a point, stop at any point and return to that same point in the lecture when it is convenient again, or replay the lecture. Instructors’ PowerPoint (Microsoft, Redmond, WA) slides, including text, graphics, and pictures, can accompany the instructor’s video. Because Web-based instruction requires a new paradigm, less emphasis should be placed on the traditional lecture format. Redesign of courses warrants other multimedia presentation of content and interactive techniques. Adequate access to take advantage of video streaming is now available in many of the health care facilities, public libraries, and homes with high-speed modems. Progressive Networks (Baltimore, MD), a leader in video streaming technology, makes a basic version of RealAudio and RealVideo software available for free and sells a deluxe version for high-speed modems through its Web site. RealVideo formats are optimized for low-to-medium speed connections, which include 14.4- and 28.8-kbps modems and video streams at 56.6-kbps modems that can be optimized to deliver maximum performance. Mergers taking place among the telecommunications companies are making promises of future increased bandwidth to homes. With nearly 70 million subscribers, the cable-TV industry is clearly in the driver’s seat.

Prices of computers have dropped sharply over the past few years, making computers equipped with high speed (56.6 kbps) modems within the price range of many students. However, students for whom a computer purchase is not an option can be directed to lease options with a computer supply company. Major computer manufacturers offer low-cost student rental agreements that include 48-hour turnaround for computer repair and replacement. The cost of renting a computer to participate in on-line courses may be offset by savings in traditional educational expenses, such as travel to the university, parking, and child care.

**Hardware and Software Technical Support**

To assure success, colleges must be able to provide technical support for implementation of Web-based courses. For colleges with limited resources, outsourcing of Web server site maintenance is available.
Colleges maintaining their own Web sites will need to plan for the services of a Web master to maintain the Web server, work with the faculty on course material development, post materials from faculty and students on the server, and assist students with technical difficulties. Even technology-oriented faculty will be challenged to keep up with adding new content, making sure all the links are still functioning and performing numerous other tasks in maintaining a Web site. They would benefit from a team approach to Web-based instruction. "Ideally a course team would consist of an instructional designer, a producer/director, a graphic artist, a subject matter specialist, and an evaluator" (Saba, 1998b). Research on web-based instruction indicates that technical support in the form of Help Desk assistance is essential for students to be successful and to feel satisfied with this mode of instruction.

Web-Based Instructional Model

Colleges interested in implementing on-line education need to develop a Web-based instructional model that takes advantage of both the interactivity and substantial resources for learning provided by the Internet. Designing a Web-based course involves thinking through a number of pedagogical considerations. The instructor role must change from lecturer to facilitator/leader. Faculty guide students through necessary information, in a nonlinear environment, that enables them to construct knowledge in new and more meaningful ways. It is necessary to build a sense of "classroom community" and enhance learning by incorporating collaborative elements and insuring academic integrity (Gray, 1998). As in all models of learning, faculty are in charge of the content. However, with distributed learning, faculty need the assistance of a team of experts. The new learning environment—the Web—with its array of communication tools, is a truly revolutionary medium. Therefore, much of what we know about designing and developing instruction for the classroom, textbooks, audio, and video needs to be reinterpreted and restated in the new environment (Boettcher, 1998). In addition, research clarifying how the learner, the learning task, and technology interact is limited (The Institute for Higher Education Policy, 1999). "The possibilities of Web instruction are boundless. But many educators, both teachers and designers, are at a loss for how to use this tool properly" (McManus, 1997a). Models of instruction appropriate for the Web are sorely lacking. Much of what is being attempted in this area continues to be based on a traditional model of university instruction that is inappropriate for the Web environment. New models are needed (Duchastel, 1997).

Instructional design, although always important, becomes critical in distributed learning to ensure that the learning provided is both appealing and effective. For this reason, colleges must seek expert consultation on the overall conceptual design of courses. The Web itself is an excellent source of frameworks and teaching strategies for getting started with on-line courses. These resources contain valuable information in areas such as motivating online students; engaging students from a variety of angles to allow them to feel that they are a part of the subject matter; goal-based scenarios; and effective handling of e-mail communication.

Adult Learning Theory

A Web-based instructional model for RN-BSN students should be based on Malcolm S. Knowles' (1984) approach to adult learning—the Andragological Model. Principles of adult learning are inherent in Web-based instruction and appropriate for students who are registered nurses. First, according to the model, the learner is a self-directed individual responsible for his or her own life. Well-designed Web-based instruction enables learners to be self-directed, to take control of the learning experience, proceed at their own pace, and make decisions about the material they wish to view. Adult learners do not appreciate being herded from place to place, being passive listeners, or being told they must do something. Therefore, learning activities that emphasize responsibility rather than obedience produce the best results (Ramsborg, 1995). Research indicates that RNs who decide to return to college to complete the BSN degree are self-directed individuals willing to assume responsibility for an important career goal (Matthews & Travis, 1994).

Second, the Andragological Model assumes that adults bring both the quantity and quality of their life experiences into the learning situation. As adult learners, RNs bring to the educational experience different levels of knowledge and backgrounds that are ideal for sharing with other students through interactive discussions and posting of case studies and required class presentations. Because of the different backgrounds of these adult learners, their needs will vary and can be met with the richness of the resources available from not only the college's course materials but also the resources of the entire Internet.
A third principle relates to the learner's readiness to learn. The model assumes that learners become ready to learn when they experience a need to know or to do something to perform more effectively in some aspect of their lives. As noted earlier, the majority of RNs who return to pursue a baccalaureate degree are motivated by the changing health care industry, which necessitates lifelong learning and acquisition of advanced knowledge and skills to remain competitive in the work force.

Fourth, because adults are motivated to learn after they experience a need in their life situation, they enter an educational activity with a life-centered, task-centered, or problem-centered orientation to learning. Therefore, the adult learner is learning not for the sake of learning but to be able to perform a task, solve a problem, or live in a more satisfying way. The Web-based instructional approach provides the mechanism for RNs to obtain and continue to maintain the lifelong learning they need.

Fifth, adults are life-centered in their orientation and learn more effectively in the context of application to real life. Web-based instruction is ideal for posting case studies, which require application of nursing knowledge to real-life situations. Students presented with case studies must analyze the material, demonstrate understanding of the material, and respond online interactively with the instructor and fellow students.

Finally, the Andragogical Model states that adult learners are motivated to learn more readily from internal motivators—such as self-esteem, recognition, or better quality of life—rather than from external motivation. The opportunity to pursue a BSN over the Internet at the student's choice of time and place takes advantage of the RN's desire for better quality of life and sense of accomplishment.

Teaching and Learning Considerations

Providing a complete program on-line challenges both faculty and students. Students face the concurrent challenges of learning basic computer skills, new software, and appropriate communication skills. Educators must help all students become adept at distanced interaction, develop skills of information gathering from remote sources, communicate effectively in writing, and collaborate with dispersed team members. These skills are as central to the future American workplace as learning to perform structured tasks quickly was to the industrial revolution (Dede, 1997).

Although troubleshooting computer problems throughout the student's course of study is the responsibility of the technical support staff, students need to learn many computer skills up-front. To facilitate success, a nursing informatics course should be available as a first required course of the program. The students need skills for using e-mail, participating in discussion groups, posting papers, making presentations, commenting on case studies, conducting online searches of the university library resources, and searching for information and resources for papers on the Internet. These skills can be accompanied by assignments that teach students to use the basic application programs, such as word processing, graphics, spread sheets, and data bases. An informatics course is crucial to student satisfaction with the program.

Faculty also need to learn new skills because redesigning and conducting on-line courses are time consuming and challenging. The virtual reality classroom is not for all faculty or all students. Faculty must be very competent with computers and communicate clearly in writing. They must genuinely like the spirited interaction and unexpected occurrences that are inherent in this type of instruction. "Probably the single most important behavioral practice which produces relatively good results in online courses is the timely and 'personal' (in tone) response by instructors to questions and contributions of students online" (Hiltz, 1995, p. 8). Faculty incentives and rewards must be provided for teaching on-line courses. These incentives could include an option of release time or overload pay for course development; limited, manageable class sizes; and valid recognition for accomplishments.

Faculty who teach on-line courses should have input into the formation of college-level policies and procedures for distributed learning. Issues such as work load, promotion, credit toward tenure and merit, copyright ownership, use of copyrighted materials in course development, and faculty responsibilities to students must be addressed.

Provision should be made to ensure that academic content and rigor are maintained while adopting the new educational modalities afforded by the technologies. Curricular issues include accreditation, curricular revision and approval, enrollment limits, academic residence requirements, academic expectations of students, prerequisites, transfer policies, collaboration partnerships, preceptor agreements, and program evaluation.
Student Services

Student access to noninstructional services requires a review of the current policies and procedures for traditional students to determine if they meet the needs of students in the distributed learning program. Programs must ensure that services provided by university departments such as admissions, financial aid, registrar, bursar, academic advising, student orientation, computer and network services, university bookstore, university library access, and academic support services (e.g., writing center, etc.) meet these students' needs. Colleges must work with the various departments to arrange for students enrolled in the program to access university services from their homes or workplaces. An administrator needs to be responsible for troubleshooting access problems encountered by the students. Academic advising can be provided via e-mail and/or the telephone. Arrangements must be made for students to purchase books and course materials through the bookstore without coming on campus.

Nationally, university libraries are already moving toward providing greater access to on-line services for all students. Library access can be enhanced by funding the purchase of additional electronic nursing journals so that students can obtain these resources from their homes. Although remote (virtual) students become accustomed to classes being offered anywhere, anytime by the (virtual) university, they also must have the corresponding resources available to them in an easily accessible digital format from the (virtual) library (Luther, 1998).

Evaluation

The overall evaluation plan should emphasize both formative and summative evaluation. Any plan must assess both the effectiveness and efficiency of the program's efforts to establish all courses as high-quality, remote learning opportunities for students.

Efficiency is basically concerned with system variables. Measures must be developed to determine (1) how well staff and faculty members met the needs of the students, (2) the ratio of costs and access of the program compared with traditional educational offerings, (3) characteristics of program operations and its participants as well as their role and influence on changes in outcome variables, (4) student perceptions of program operations, including reports of time involved in resolving technical difficulties and satisfaction with access to course and resource materials.

Evaluation of the effectiveness of Internet programs for RNs completing their baccalaureate degrees in nursing focus on those factors already familiar to nursing faculty. Elements to be measured provide assessment of outcomes for the curriculum, students, graduates, faculty (including preceptors), and employment sites.

Finally, as a new delivery method, selected measures specific to this type of education need to be considered. These include but are not limited to (1) student reports of satisfaction with access to faculty, (2) documentation of the number of contacts with the Help Desk, (3) review of mechanisms for faculty evaluations of Internet course offering by students, and (4) effective review criteria for faculty classroom performance for Internet courses by administrators.

Summary

Institutions of higher education are challenged to provide improved access to educational opportunities for students. Internet programs can be considered whenever there is a population of learners who are identified as motivated, self-disciplined self-starters (Duffy, 1997). RNs desiring to earn their BSN degree are a prime example of such a population. These RNs represent a ready source of highly qualified and committed individuals. Constraints of time, travel, and family responsibilities, however, have discouraged many from returning to school. Offering a Web-based instructional program can be an effective solution for overcoming these constraints. Applying principles of adult learning theory in creating effective teaching strategies and the development of appropriate outcomes measures offers new opportunities for faculty growth in the information age. RN completion programs are a perfect fit for distributed education. Innovations for delivery of programs can enable nursing education to seize the opportunity to lead the way into Internet educational programming.

References


