CREATING NEW FUTURES IN NURSING EDUCATION

ENVISIONING the Evolution of e-Nursing Education

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Along with the current shortage of registered nurses, the United States is experiencing a significant shortage of nurse faculty. Research data reveal a severe imbalance between the large number of retirements and the small number of replacement nurses preparing for the faculty role (1,2). Without sufficient numbers of faculty, nursing programs are turning away qualified applicants. To add to the problem, master’s education graduation patterns have shown a steady decline (3). This is noteworthy as master’s graduates are the source of a significant percentage of current and future faculty. • The nurse workforce shortage, coupled with a growing need for faculty, calls for redesign, restructuring, and recognition that the flexibility and availability of technology offer nursing education enormous opportunities for innovation. Key questions must be considered in applying technology to the delivery of education: What incremental technological changes do we have now? How do we envision technology being used? What can we imagine for the future?

A Rationale for Redesign The United States has experienced nursing shortages in the past. However, because of the limited number of nurses in the pipeline positioned to replace retirees, the current shortage is expected to last longer and be more severe than any in recent memory. By 2011, the number of retired nurses will surpass new graduates (1). Nationwide projections indicate that by the end of the decade, there will be 12 percent fewer nurses than needed. By 2015, that figure will increase to 29 percent. During this time, the demand for nurses will grow by 40 percent.

Despite demands, many programs cannot admit more students because of the shortage of faculty. In 1993, 9.5 percent of the graduates of master’s programs in nursing specialized in nursing education. By 1999, this figure had dropped to 2.5 percent (2).

A concurrent trend has been the development of new technologies and the growing interest in technology by the public at large. Many individuals who at one time approached technology with skepticism are now telecommunicating from their homes (4). In education, technology has allowed long distance delivery to geographically remote regions and expanded access to important databases (5).

What Innovations Are We Using Now? Nurse educators are breaking away from established patterns and charting new pathways. Consider the following innovative approaches to education:

• Nursing education bolstered its infrastructure and incorporated new approaches to education (6) through the use of such devices as hand-held computers and wireless telephones. Innovations include long distance delivery, web-based education, electronic drills and practice, online testing to prepare graduates to work with telemedicine and telehealth, digital hospitals, humanoid robots, and wireless health-monitoring systems.

• Indiana State University developed the nation’s first and only baccalaureate degree program for licensed practical nurses (LPNs) delivered entirely through distance learning (7).

• High schools in 25 states and eight countries participate in “Virtual High School,” allowing their students to select from nearly 150 accredited online courses including core, elective, advanced placement, and international baccalaureate offerings (8). To attract computer-savvy high school graduates, colleges and nursing programs are working to offer technologically enhanced learning opportunities comparable to the high school experience.
The National League for Nursing has championed efforts to shape the future of nursing education through the Nursing Education Advisory Council Task Force on Innovation in Nursing Education (9).

A new institute for nurse educators sponsored by the University of Maryland School of Nursing prepares nurses with the essential knowledge and skills for teaching with a variety of teaching methods including technology (10). The University of Kansas, Walden University in Minneapolis, Villanova University in alliance with the National League for Nursing, and the University of St. Francis in Illinois also have programs to prepare individuals for the technology-enhanced nurse faculty role (11).

In Oregon, nurses formed a statewide consortium to maximize the use of scarce faculty, equipment, and clinical resources by sharing curricula among schools of nursing and using simulation laboratories and distance learning (12).

In Wisconsin, 16 technical colleges adopted a statewide curriculum effective in 2004. Students can choose online or traditional methods for theory, and instructors can individualize learning activities and delivery. All programs teach to the same standards, and learners are expected to achieve the same skills (13).

The Nursing Education and Technology Project (NEAT) plans to develop small units of content, or modules, that can be assembled into different formats. These will be shared among institutions and tailored for specific groups of students. Partners include the University of Wisconsin-Madison, the University of Detroit-Mercy, the University of North Dakota, the University of Kansas, Arkansas State University, Indiana University, and the Association of Academic Health Centers (11).

In the United Kingdom, a course at the University of Wales, College of Medicine, Cardiff, uses the Internet and “focused group settings” for inductive learning in facilitating clinical decision-making. The teacher is a resource for students. Students select their own learning methods among e-learning, discussion groups, and distance communication. After presenting course content, the teacher tells her students: “I’ve said all I’m going to — this is your course. I’ll do what you want me to” (14).

Challenges to Traditional Ways of Thinking More remains to be done. According to futurists, the overarching goal of innovation is to design beyond the information age and strive for changes in mental structure or ways of thinking. Charting pathways to the unknown is scary and best started with incremental change (15). Consider how these technologies offer opportunities for innovation:

- **MOBILE DEVICES** Distance learning and wireless transmission are becoming more prevalent, easier to manage, and readily accessible through cellular telephones that allow access to the Internet for data, email, multimedia messages, and streaming video (16). Globally, the number of mobile phones in use is approaching one billion. In the US, cellular telephones are increasingly important as more and more people give up traditional telephone service.

- **ELECTRONIC GAMES AND SIMULATIONS** The Millennials do not tolerate being communicated “at” but expect interactive engagement. Members of this younger generation embrace new technologies and are good at multitasking and parallel processing. They access information in a nonlinear manner through hyperlinking and are accustomed to good graphics. For nursing education, the challenge is to create games and simulations that will transmit nursing content and that will motivate younger people to enter nursing (17).

- **VIRTUAL REALITY** Enhanced computer capabilities for virtual reality will provide a total immersion experience, allowing users to absorb knowledge through all of their senses. An image-oriented language, incorporating objects in motion and sound to augment words and symbols, will lead to computer-assisted imagination. Eventually, universal access to all human knowledge will become reality (18).

- **ELECTRONIC HEALTH CARE DELIVERY** Technology in the health care delivery sector will influence curriculum content. For example, a “smart house” lab at the University of Florida coordinates the health-monitoring and alerting functions of an array of assistive devices, allowing elderly individuals to live on their own safely for longer periods of time, while reducing health care costs in the process. Intelligent walkers increase mobility by assisting with lifting, moving users across uneven surfaces and around obstacles, and monitoring blood pressure, pulse, and possible falls. A wristwatch monitoring device can detect falls and monitor pulse, respiration rate, and skin temperature, transmitting information and triggering an alarm. A remotely controlled, continuous monitoring system consists of a decoder linked to a television, a

**ABSTRACT** This article discusses the explosion of technology and its impact on nursing education in the face of a nurse educator shortage. An attempt is made to answer the following questions: What incremental changes in technology do we have now? How do we envision technology being used in the future? Four scenarios of nontraditional approaches to nursing education are presented. They touch on the delivery of education with increased technology and universal access; the teacher as educator/mentor/coach; the product, including testing, outcomes, competencies, and process; and attracting and keeping human attention. The final section focuses on issues to consider as nurse leaders and educators bring nursing education into the future.
miniature camera, and a broadband telephone line to enable medical data uploads and enhanced communication (19).

What Can We Imagine for Nursing Education in the Future? These implemented incremental changes are indicative of major nontraditional shifts in nursing, higher education, and health care (20). To further prod nursing education toward revolutionary innovation, more changes are needed such as those posed in the following scenarios.

SCENARIO 1 Delivery Method: Increased Technology, Universal Access Classroom lectures and dialogue will be transmitted by integrated, electronic, mobile devices accompanied by onsite or electronic skill supervision. The method of learning will not matter as much as the student's ability to demonstrate what he or she knows. Personalized learning requiring problem solving and crisis intervention will be rapidly transmitted electronically though safe, secure, and confidential systems. Electronic textbooks (e-texts) will be imbedded with pictures, videos, and simulations. Simulations will be “games” without words, depicting actual events and requiring the learner to respond interactively to a situation. “Entertainment” devices (delivered using multilink, interactive, entertainment approaches) (15) will use graphics, sound, and animation as well as virtual reality simulations to support learning. Nursing education will be available globally, with direct, real-time language translation as needed in learner-centered communities.

SCENARIO 2 Teachers: e-Teaching and Educator/Mentor/Coach Faculty will guide their students through unique, specially designed curricula. As learner-case managers, they will interact electronically with clinical preceptors and other onsite personnel to evaluate the learner’s knowledge and skills. No longer will controls of information, faculty will be valued for intellectual capital and their ability to guide learners to access materials electronically and seek assistance, as needed, in learner-centered communities. Learner-case managers will interact across “boundaries” and reach unlimited numbers of students.

Faculty will have flexibility in negotiating contracts with purveyors of education and in creating and revising materials for the electronic media. They may be entrepreneurs and/or star professors — marketing directly to students or to private education distributors.

SCENARIO 3 Product: Testing, Outcomes, Competencies, and Process Electronically generated, customized “tests-for-one” will match specific learner profile and incorporate simulations and linked items/scenarios that require the learner to demonstrate critical thinking, judgment, and the ability to handle ambiguous situations. Tests will be electronically evaluated with immediate results generated for student and teacher. Each test will be unique, disposable, and used only once for the targeted student.

Nursing programs will have rolling timeframes. Learners will demonstrate achievement and competence in meeting objectives and then move seamlessly to the next set of objectives. This means that individual learners will complete modules of objectives, learning experiences, and competency measures at different intervals and “graduate” at any time. Lifelong learners will return to the system as needed. The curriculum will also emphasize what the learner knows and demonstrates, rather than the length of time or method used by the learner to obtain the information (21).

SCENARIO 4 Purpose: Human Attention In and beyond the information age, experts conclude that the only true scarcity is human attention. To capture the learner's attention, Kelly recommends applying the “four-steps-in-relationship” techniques (R-tech) (22): Create what the customer wants, remember what the customer wants, anticipate what the customer wants, and change what the customer wants. In this way, the relationship is reciprocal between the provider and customer. Amazon.com is cited as a practice model.

Applying this model to nursing education, faculty will have an electronic profile of each student that shows the student’s unique patterns, preferences, and habits. To develop a reciprocal relationship with the student and customize a curriculum, a nursing content blueprint is created based on the student’s preferences and anticipating the student’s needs. It is changed by offering choices such as alternative websites, electronic references, web-based modules, simulations, and virtual reality. The student’s choices will be tracked electronically, resulting in the creation of options that might be helpful for other students who had similar preferences. The nursing student provides input into the nursing education process by critiquing learning components such as software, modules, e-books, e-tests and other assessment tools, learning methods, faculty style and availability, and communication with other students. Students will offer alternatives useful to their own learning and assist in developing electronic learning methods.

Looking Toward the Horizon Institutional reform and policy changes in nursing and higher education remain a challenge. Several thought-provoking questions are worth considering for nursing, higher education, and health care.

- Considering the changing nature of the faculty role, is tenure still relevant (23)?
- Considering the mobile nature of the learner and educational delivery, what is the future of expensive-to-maintain physical
plants with bricks and mortar classrooms (23)?
• Are degrees relevant in a society that requires lifelong learning (23)?
• Given the change in traditional methods, what will society value? For example, what will be the status of institutional autonomy, honesty, civility, and personal and social responsibility and ethics (23)?
• Given the changing nature of education, what teaching credentials (if any) should nurse educators have and how will they earn them?
• What is the future of human touch and face-to-face contact in the impersonal technological world? What impact will technology have on the historically valued, interpersonal relationships in nursing?
• What are the best human replacement strategies with electronic health care delivery (robots, simulation, digital hospitals, telehealth, an ageless society, smart houses, imbedded sensors)?
• How does privatization of education play a part in nursing education and what will be the impact?

Albert Einstein suggested that in the middle of difficulty lies opportunity. Unquestionably, the opportunity exists in academia and nursing for revolutionary innovation. The innovations cited in this article are indicative of the beginning of transitional reform in nursing practice. The challenges to traditional ways of thinking, suggested future scenarios, and issues on the horizon demonstrate the opportunities ahead. Nursing education urgently needs imaginative and resourceful leaders and educators to conceive of the new nursing world, invent designs that move nursing education far beyond the information age, develop contracts with technological collaborators, and influence the issues on the horizon.

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References