The TIGER Initiative

Virtual Learning Center: A TIGER Collaborative Report

Technology Informatics Guiding Education Reform (TIGER)

www.thetigerinitiative.org
Overview

The TIGER Initiative, an acronym for Technology Informatics Guiding Education Reform, was formed in 2004 to bring together nursing stakeholders to develop a shared vision, strategies, and specific actions for improving nursing practice, education, and the delivery of patient care through the use of health information technology (IT). In 2006, the TIGER Initiative convened a summit of nursing stakeholders to develop, publish, and commit to carrying out the action steps defined within this plan. The Summary Report titled Evidence and Informatics Transforming Nursing: 3-Year Action Steps toward a 10-Year Vision is available on the website at www.thetigerinitiative.org.

A COLLABORATIVE APPROACH

Since 2007, hundreds of volunteers have joined the TIGER Initiative to continue the action steps defined at the Summit. The TIGER Initiative is focused on using informatics tools, principles, theories and practices to enable nurses to make healthcare safer, more effective, efficient, patient-centered, timely and equitable. This goal can only be achieved if such technologies are integrated transparently into nursing practice and education. In order to meet the demands of an increasingly electronic and rapidly changing healthcare environment, it is essential to address the educational needs of the nursing workforce. Collaborative teams were formed to accelerate the action plan within nine key topic areas. All teams worked on identifying best practices from both education and practice related to their topic, so that this knowledge can be shared with others interested in enhancing the use of information technology capabilities for nurses. Each collaborative team researched their subject with the perspective of “What does every practicing need to know about this topic?” The teams identified resources, references, gaps, and areas that need further development, and provide recommendations for the industry to accelerate the adoption of IT for nursing. The TIGER Initiative builds upon and recognizes the work of organizations, programs, research, and related initiatives in the academic, practice, and government working together towards a common goal.

THE COLLABORATIVE REPORT

This report provides the detailed findings and recommendations from the TIGER Consumer Empowerment and Personal Health Records Team. For a summary of the work of all nine TIGER Collaborative Teams, please review “Collaborating to Integrate Evidence and Informatics into Nursing Practice and Education” available on the website at www.thetigerinitiative.org.

The TIGER Virtual Demonstration Center (VDC) Collaborative team was developed to help educate nurses so that they are more competent and comfortable using technology tools for clinical decision making and practices. This report describes the need for the VDC, its use for nursing education and the current and future trends.

Table of contents

1. Executive Summary (p.2 )
2. Background (p. 3 )
3. Demonstration Exemplars (p. 5 )
4. Current trends in technology demonstration (p. 7 )
5. Using technology in nursing education (p.8)
6. Future of virtual demonstration centers (p.12)
7. Conclusion (p. 14 )
8. References (p. 15 )
9. Acknowledgement (p.17)
Health information technology is the key to health care reform. It has become imperative for nurses to be competent with the use of technology tools for their clinical practice and decision making. It has however been recognized that, there is some form of informatics illiteracy in nursing education. To address the need for informatics literacy amongst nurses, Technology Informatics Guiding Education Reform, TIGER was formed.

To leverage the use of technology in nursing practice and education, educators have partnered with vendors and come up with different types of demonstrations. They include the Observable demonstrations (watching a video or Powerpoint), Trialable (allowing for participant-directed experimentation in a safe environment), Learn-while-doing demonstrations and Simulations. The nursing education mainly involves classroom and clinical settings. This should be supplemented by both simulatory lab sessions and virtual learning.

But, the limited access to information systems and technology that could improve healthcare delivery remains a barrier to nursing education. Nurses who practice are limited to the currently deployed technology solutions at their organization, and have limited exposure to new technologies.

The TIGER Virtual Demonstration Center Collaborative team was thus created to develop a Virtual Demonstration Center (VDC) Pilot that could address these needs. The Virtual Demonstration Center Pilot provided exemplars of best practice for technology utilization, contact resources and virtual networking opportunities and demonstrated how use of technology could result in safer, more efficient, equitable, effective, timely and patient-centered healthcare. The Virtual demonstration center can help demonstrate the utility of technology for improving practice and education and can thus be an effective facilitator of the rapid diffusion and adoption of educational and practice technologies.
A few years ago, during the American Informatics Medical Association annual conference keynote address, Dr. David Brailer spoke about the importance of integrating information technology in healthcare. His remarks included the old saying about how a rising tide floats all boats. This adage prompted a discussion between nursing informatics leaders at the conference on what nursing boats could be launched on this rising tide.

Nurses have long embraced the use of technology in practice and have been leaders in the use of technology in education (Weiner 2008). However, there are some gaps in what informatics and information literacy competencies we teach in nursing education that are needed for effective nursing practice (Pravikoff et al. 2005). These nurses saw the need to organize a concerted effort to integrate the use of information technology into practice and education in the future. It is this rising tide of nursing practice incorporating new technologies that will “float the boat” of healthcare information technology adoption.

To address this need for advancing the use of information technology in nursing education the Technology Informatics Guiding Educational Reform (TIGER) was formed. In order to transform nursing practice and education to better prepare nurses to practice in an increasingly automated, informatics-rich, and consumer-driven health care environment the following TIGER recommendations must move forward (TIGER 2007):

- Demonstrate collaboration between industry, healthcare organizations, academic institutions, and professional organizations to create educational modules for nurses that are based upon informatics competencies.
- Provide universal accessibility to this demonstration for all nursing stakeholder groups.
- Use practice examples from different practice environments that can demonstrate best practices, results of research, case studies and lessons learned by partnering with nursing professional organizations.
- Demonstrate how integrated IT systems impact nurses and the quality and safety of patient care.

Demonstrating the use and utility of technology for improving practice and education can be an effective facilitator of the rapid diffusion and adoption of educational and practice technologies (Russell et al. 2008; Sockolow and Bowles 2008; Tarrant et al. 2008). “Diffusion theory, as described by Everett M. Rogers, informs us that the innovation adoption decision process “is essentially an information seeking and information-processing activity” (Rogers 2003).

Within the industry today there are a wide variety of innovative solutions aimed at addressing this information seeking need, that demonstrate the usability of technology in the delivery of patient centered care. To persuade the nursing profession and all stakeholders to adopt these solutions, we must identify solid examples, demonstrations and outcomes. Demonstrations should be designed on four levels, moving from minimal to extensive participant interaction and involvement. Adopters may need to move through each of these phases prior to innovation adoption or
can choose to adopt at any level. However, the more engaged the individual is with the innovation, the more likely they are to view the innovation positively.

- **Observable demonstrations** (watching a video or Powerpoint) are an important first step in the information-gathering phase of the adoption decision process.
- **Trialable** (interactive multi-media) demonstrations are more complex, allowing for participant-directed experimentation in a safe environment. This hands-on process can answer specific questions a nurse may have, reducing uncertainty.
- **Learn-while-doing demonstrations** move closer to goals like training and allow for initial and continuing education, again in a safe environment, particularly important for patient care devices or systems.
- **Simulations** move from simple demonstrations to more involved scripted educational experiences and can also allow for user feedback on needed changes to support real-world use, better ideas for development and experimentation with customization.
Demonstration Exemplars

Educators, providers and vendors are currently partnering to provide sustainable educational models that leverage technology in care practices and education. It is essential to incorporate technology in the education of current and future nurses and other healthcare professionals, both to support the integration of information technology in healthcare, and to prepare tomorrow’s nurses (Gassert 2008). There are solutions available today that support this goal and do not require large financial commitments or large human resource requirements. The benefit to nursing education, and ultimately to patient care, from these low cost solutions is clear.

These following exemplars are just a few of the creative ways educators and vendors are using new technology and evolving media in order to educate and get important information out to those who need it.

Observable Exemplars

Healthcare organizations and IT vendors have partnered to create demonstration videos and multimedia to educate caregivers and purchasers of health IT. The goal of these demonstrations is to allow for the observation of a new technology in the actual care delivery setting. One exemplar, created by Siemens Corporation, is a Nursing Thought Leadership Web Cast Series - ‘Information Technology Supporting Clinical Excellence’. www.siemens.com/clinicalgateway, (Siemens AG, 2009). In this Web Cast Series nursing professionals can see technology being integrated into actual care delivery through scenarios and can also hear from other executives and industry leaders regarding what they feel are some of the benefits of health IT.

A lighthearted observable demonstration is the UAB Emergency Room Rap, a creative musical video created by ER Nurses at the University of Alabama at Birmingham (UAB) as part of their observance of National Nurses Week (University of Alabama at Birmingham Health System, 2009). The Video uses humor and music to provide lay persons and potential future nurses a window into the world of an Emergency Nurse. You can find this delightful example at: http://uabhealthtv.photobooks.com/default.asp?ChannelID=6&ProgramID=93%22

Triable Exemplars

Trialable demonstrations engage the nurse in an interactive manner. An exemplar for this level of demonstration is the Microsoft Patient Journey Demonstrator (MPJD). The MPJD uses clinical scenarios to demonstrate their patient-centered care record. From their website launch page you can interact with a patient record for tasks such as managing appointments, enter and review patient data and create notes (Microsoft, 2009). As an interactive demonstration, the nurse/participant can explore in a self-directed manner, experiencing the demonstration at their own pace and in an order that makes sense to them. The MPJD website launch page can be found at: http://www.mscui.net/PatientJourneyDemonstrator

A second exemplar for interactive demonstrations is The University of Tennessee Health sciences centers “The Listen Project”. A YouTube video was designed and made available as an introduction to the project to help promote nurse assessment skills as well as evidenced based practice. The project extends to interactive demonstrations to stress the importance of developing “information literacy competencies of student and professional nurse” (The LISTEN Project,
You can access The Listen Project video at: http://www.youtube.com/watch?v=XHVqLliBgdo.

**Learn-While-Doing Exemplars: Academic Education Solutions**

Moving to the next level of complexity some schools of nursing have collaborated with health IT vendors to produce academic education solutions containing portals, interactive experiences and hands-on simulation where students actually use the vendor’s IT tools, via a vendor-based demonstration solution. Ball State University and Cardinal Health System and the McKesson Corporation created an environment to provide documentation experience with an Electronic Health record used in clinical rotation (TIGER, 2009). Students are able to assess their patients and then document their findings in the vendor-based electronic nursing documentation system, minimizing workflow disruptions for the hospital staff. This partnership supports student access to an EHR without the costs of having an in-house school of nursing EHR system.

Another advance in transforming health education is being undertaken by the University of Kansas Center for Healthcare Informatics and the Cerner Corporation. In this collaboration model these organizations have created an academic education solution - the *Simulated E-health Delivery System (SEEDS)*. This solution is designed to provide teaching and learning tools to assist health professional students to develop competencies to harness the power of information technology, thus improving the quality, efficiency and effectiveness of healthcare (TIGER 2009). More information on identifying best practices for implementing an academic education solution can be found at: http://www2.kumc.edu/healthinformatics/video.html

**Simulation Exemplars**

The highest level of virtual demonstration is found in simulation centers. There are several exemplars of simulation and below are just a few examples.

The Garfield Innovation Center is a simulation care delivery environment where healthcare professionals can have a complex immersion experience based on realistic scenarios (Kaiser Permanente, 2009). The Center also allows for experimentation, prototyping and trouble-shooting in this hands-on mocked-up clinical environment. An additional strength of the Center is the collaborative nature of the simulations, bringing together professionals from different areas as participants. A description of the Garfield Center can be found at: http://xnet.kp.org/innovationcenter/about.html

Simulations can also be based in virtual worlds like Second Life. In 2006 IBM developed a Virtual Healthcare Island (VHI) in the virtual world Second Life. The VHI was designed to be a unique, virtual world simulation of the challenges facing today’s healthcare industry and the role information technology will play in transforming global healthcare-delivery to meet patient needs. The island is modeled to have “patients” go to their home on the VHI, enter information into a personal health record, visit the laboratory to have blood drawn, the clinic to discuss the results with a physician and then to the pharmacy if medications are prescribed. One possible evolution of the healthcare islands like the VHI would be to provide a virtual platform for vendors to demonstrate new devices. A short, narrated video on the VHI can be found at: http://www03.ibm.com/press/us/en/pressrelease/23580.wss
Current Trends in Technology Demonstration

The TIGER Virtual Demonstration Center Pilot

One of the recognized barriers to improving informatics education for all nurses remains the limited access to information systems and technology that could improve healthcare delivery (Melo and Carlton 2008; Vestal et al. 2008). Often times, access is limited to the systems that are currently deployed in a given location. Nursing schools often rely on the clinical practicum site to provide access and education on EHRs. Nurses in practice are limited to the currently deployed technology solutions at their organization, and have limited exposure to new technologies that could be applied in innovative ways to their environment to improve healthcare delivery. The TIGER Virtual Demonstration Center Collaborative team was created to develop a Virtual Demonstration Center Pilot that could address these needs.

The purpose of the Virtual Demonstration Center Pilot is to explode current thinking about what healthcare is, by engaging visitors in the demonstration of potential healthcare futures that demonstrate innovative, high quality, and maximally efficient care scenarios in compelling ways. Visitors to the Virtual Demonstration Center Pilot were able to participate in building improved healthcare future states. The Virtual Demonstration Center Pilot is intended to provide a virtual “Gallery Walk” to all nurses, nursing faculty and nursing students via web access to nurse-focused technology applications. The Virtual Demonstration Center Pilot provided exemplars of best practice for technology utilization, contact resources and virtual networking opportunities.

Using the innovative Healthcare Information and Management Systems Society (HIMSS) Virtual Conference & Expo Platform, http://www.himssvirtual.org/, we were able to test a variety of different themes and concepts in order to determine how best to engage our audience—the nursing practice and academic communities (HIMSS 2009). We provided access to over thirty resources that demonstrate how technology can be used to enable nursing education and nursing practice resulting in safer, more efficient, equitable, effective, timely and patient-centered healthcare. This timely event engaged over 300 nurses in the current issues that the TIGER Initiative is focused on—interoperability, the National HIT agenda, competency-based education, improving the usability of clinical application design, and empowering consumers. It is envisioned that this pilot and other emerging programs will support nursing professionals as they adopt IT in their practice environments and also to support nursing education as curricula change to prepare nurses for the future.

Guidelines and example scenarios were developed for industry partners to reinforce the TIGER Initiative message. The scenarios provided were used with permission from the HIMSS 2008 Interoperability Showcase. These clinical scenarios demonstrated interoperability, focusing on clinician and patient access and information sharing across the continuum of care and were designed to provide examples of current, short-term and long-term future use of HIT.

The content, guidelines and scenarios has also been made available for viewing at the TIGER Initiative Virtual Demonstration Center Collaborative Wiki http://tigervirtualdemo.pbwiki.com/
Using Technology in Nursing Education

The level of technology use in the clinical setting is growing by leaps and bounds. In order for practicing nurses to be competent and comfortable with these technologies they must be engaged in the application of technology during their nursing education. Using technology tools to support decision making, guide clinical practice, retrieve information, and simulate practice have become very effective for both teaching and learning.

The types and uses of educational technology are changing every day, but the intent is the same; to engage students in exploring educational content in a manner that suits their learning style, learning needs, and provides informational access where and when it is needed. Accomplishing this goal requires a change in the way nursing is now generally taught, and will involve educating faculty in using the technology as well as students. Educating faculty to recognize the value and necessity of using technology in nursing education will lead to its becoming an institutional priority. Goals related to the integration of informatics and technological competencies need to be explicitly included in the organizational strategic plan. Doing this keeps these objectives in the foreground focusing the allocation of resources and effort (Struck and Moss 2009).

In nursing education we now use a myriad of technologies to enhance teaching and learning. Although there are some that might be used in several settings, these technologies can be generally viewed as those that are used in a face-to-face classroom, those that are used in an online or virtual environment, those that are used in simulation laboratories, and those technologies that are used in the clinical setting.

Classroom Setting

For effective teaching of today’s student we must move past the instructor ‘talking at the class’ accompanied by a power point slide presentation (Jensen et al 2008). Current students expect and need direct interaction with the content and each other. We now have the technology to allow students to interact with content experts across the country or across the world via distance conferencing. This same technology can enable students in the classroom to interview patients with congestive heart failure regarding how they manage their illness at home or work on a collaborative project with students from another school of nursing.

Another method for engaging students with the technology and the information is the use of online reference material in the classroom. The use of online reference materials through a laptop computer or PDA enables students to create their own learning content on-the-fly (Barrett et al, 2004). For example, students may be given a case study regarding a particular patient and asked to collaboratively develop a plan of individualized care for the patient. Then, this case can be presented to others in the class, providing practice in finding, compiling and synthesizing key information as well as presenting information in an organized and understandable manner.

Other simple tools such as audience response clickers which allow the student to respond to questions or surveys via radio frequencies to a main unit provide another method of technology integration (Jensen, 2008). Responses are automatically compiled and organized in a database by the instructor unit allowing immediate aggregate display of the response for immediate feedback and interaction. These units keep the learner involved in an interactive format and allow instructors to get an immediate assessment of
the classes’ level of understanding. These assessments can be immediately shared with students in the form of a graph or text display. They can also be used to rapidly validate pre-class preparation while eliminating the need for busy work on the part of students or instructors completing other lengthier types of assignments.

**Virtual Setting**

Virtual instruction can supplement face-to-face instruction or entire educational offerings can be provided online. The virtual environment allows students to access course materials when and where they choose allowing many more to further their education than ever before (Simpson 2003). Effective online instruction presents material in multiple formats that addresses different student learning styles. Students dislike listening to only narrated power point lectures in an online course as much as they do in a regular classroom. Meaningful course content allows the student to clearly see the relevance of learning to its application in the real world. The use of case studies and the development of products that can be used in clinical practice show clear relevance to educational goals. Student interaction with the content, course instructor, and each other are vital components to an engaging course. We now have easy to use tools to accomplish these objectives.

Originally, online course content was provided through the use of the World Wide Web in an html format that looked like most other web pages we are familiar with. Now, most virtual instruction is organized into courses and modules through the use of learning platform software (Green et al., 2006). These applications allow instructors to build courses and content with minimal technical expertise and can limit access to these courses to those who are officially enrolled. Tools available for use in most online course platforms include: secure testing, asynchronous discussion boards, synchronous verbal and text discussion, desktop sharing, pod casts, streaming video, narrated lectures, and simulations.

**Simulation Laboratory Setting**

The use of the simulators must start with the development of relevant simulations that are designed to integrate with current practice or educational curriculum. Very often students and practitioners learn procedural skills in isolation of their application in actual practice. For example, they may be highly proficient in inserting an intravenous (IV) catheter, but when faced with a patient with a plummeting blood pressure, they do not always think to initiate insertion of the IV. A number of studies have provided evidence of the successful use of simulation models in health education and practice. Indeed, the use of human simulators for nursing and medical education has been shown to enhance preparation for clinical practice across cognitive, affective, and psychomotor learning domains. For example, a study recently compared the use of a pencil and paper patient scenario, a static manikin scenario, and a patient simulator scenario (Jefferies Rizzolo 2006).

Students who were assigned to complete the scenario using a human simulator were more satisfied with the learning experience, perceived more diversity of learning modes, and were more confident about their ability to care for an actual client. Similarly, nursing students in England who were taught using a human simulator had significantly higher scores on an Objective Structured Clinical Examination (OSCE) than students who received traditional instruction (Alinier et al. 2004). A comparison of use of problem-based learning and simulation with medical students showed that simulation was superior for the acquisition of critical assessment and management skills (Steadman et al. 2006).

Simulators used in current simulation laboratories can be classified by how realistically they represent real patient situations on three levels: task trainers, low
fidelity, and high-fidelity simulators. Task trainers are those pieces of equipment that help the student acquire a particular skill, such as intravenous (IV) catheter arms or computerized catheter insertion applications. An example of a virtual task trainer is the Virtual IV manufactured by the Laerdal Company (http://www.laerdal.com/doc/6473945/VirtualIV.html). This task trainer combines self-directed computer-based scenarios with a haptic device that allows the student to ‘feel’ an IV catheter being inserted into a virtual patient. The virtual patient responds to the student’s actions both physically, by bleeding for example, and verbally by speaking to the student regarding their technique.

Low fidelity simulators are those that mimic aspects of reality, but at a level that is not highly realistic. An example of this type of simulator is a mannequin that allows the student to practice IV catheter insertion, tracheal suctioning, and bathing but does not respond interactively to the student’s intervention. One such mannequin is Susie Simon manufactured by the Gaumard Company (http://www.gaumard.com/viewproducts.asp?idproduct=23&idcategorie=47&idsubcategorie=48). In addition to allowing practice with basic skills, Susie allows students to practice giving an enema, urethral catheter insertion, or fitting a patient with an ostomy bag. Low fidelity mannequins have the advantage of being easy to use and are relatively less expensive than more interactive mannequins.

High-fidelity simulators respond to the student’s intervention in a dynamic and interactive fashion. These simulators are programmed to respond in a realistic manner based on what they are ‘experiencing’. For example, a high fidelity mannequin might exhibit a drop in their oxygen level if a student does not apply oxygen when this is an appropriate intervention within the specified scenario. High fidelity mannequins now exist for a variety of types of patients. Noelle is a mannequin that simulates the birth of a baby (http://www.gaumard.com/viewproducts.asp?idproduct=271&idcategorie=14&idsubcategorie=62), Stan (http://meti.com/products_ps_istan.htm) and SimMan (http://www.laerdal.com/doc/33202760/SimMan-3G.html) are adult male mannequins, and baby Hal (http://www.gaumard.com/viewproducts.asp?idproduct=283&idcategorie=6&idsubcategorie=77) can be purchased as a neonate or premature infant.

The use of low or high fidelity mannequins can be married to their representation in a simulated information system. Building out ‘patients’ in the information system can allow students the opportunity to gain information regarding the ‘patient’s’ history, allergies, drugs, and previous assessment data and laboratory values. The use of simulated information systems also helps the student to learn to navigate computerized clinical information systems and the electronic records they will encounter in practice. Not only will they gain technical skills, but will learn to determine what data is necessary for clinical decision making and where this may be found.

Clinical Setting

Early exposure to online resources and reference applications in the nursing curriculum enables students to develop critical competencies in utilizing information to make decisions. As competencies in processing information are developed, the use of interactive computer programs or applications can be incorporated to support clinical practice. They may present algorithms for guiding clinical practice decision such as managing a patient in heart failure, assisting with developing nursing diagnoses or care planning, and testing clinical knowledge before it is applied to the live patient thus promoting safety in patient care. There are three major types of applications: books and references;
Compilations of journals, books, and online references organized for easy searching within the application; and procedure reference applications. Compilations of journals, guidelines, and procedural references are generally produced by the major nursing textbook and journal publishers in such a way that nurses can easily search for the information they need from any location that has computer access. Some applications, such as online books, can be purchased once, while others are sold as yearly subscriptions. Organizations can choose to allow access through intranets or password protected internet sites. More and more of these applications can be downloaded or accessed through internet wireless personal digital applications (PDAs). These applications can be used by students and staff in preparation for managing patient care, performing skills in the clinical setting, and as a quick reference for determining best practice.
Creation of internet-based 3-D virtual world experience could be used to demonstrate interactive, patient-centered scenarios that are technology enabled and likely to be best practices 3-10 years into the future. Selected patient scenarios could be simulated and demonstrated in this Virtual World Demonstration Center so that students, clinicians, and others would have a real-world immersive experience, from wherever they are. The scenarios represent what could be accomplished using current technology, short-term future technology and long-term future technology. The same scenario used for each period of time can highlight how virtual demonstrations would change as the tools evolve.

**Scenario 1: Current Technology**

The Current Technology scenario is intended to demonstrate how a nursing educational experience could be designed using technology that is available today. This scenario is describes a learning environment using these tools. A virtual classroom is built for nursing students to view the scenario and interact with an Electronic Health Record (EHR) during group lecture, “live” demonstration, and individual activities to allow for experimentation. Learning objectives and lecture material is developed to teach students the basic concepts of a Personal Health Record (PHR), EHR and Healthcare Information Technology in general. The lecture would be delivered in the virtual classroom, prior to group or individual activities.

After the virtual classroom lecture, the students break into groups moving into virtual patient homes for their first group exercise. One nursing student assumes a patient Avatar, another student assumes a nurse Avatar. Together they complete a patient PHR, with the nurse guiding the patient. The other students act as references, advising the nurse and the patient. In a second group exercise, in a clinician’s office, the patient Avatar is examined by a nurse practitioner Avatar (NP), after review of the PHR. The NP Avatar documents the patient visit in the EHR using a tablet computer during the patient exam.

Once the group exercises are completed, students would move to a virtual lab where EHR and PHR screens would be provided for individual students to explore and interact with. Students would be able to interact with all components of a PHR and EHR at their own pace. The virtual lab would also have a reference avatar that would serve as a “help” function, designed to respond to student questions about a particular PHR or EHR component.

**Scenario 2: Short-Term Future Technology**

The individual pieces of technology proposed for this virtual demonstration scenario exist today, but has not been developed to work together in an integrated manner. The purpose of this scenario is to show how today’s tools could be developed and integrated to support learning.

Using a combination of the previously described virtual classroom, a second tool, like the Nintendo Wii, would be integrated into the group and individual exercises to provide a physical sense of being present in Second Life rather than relying on the strictly computer keyboard/display method of interaction. By giving the students a “physical” presence in the virtual classroom the avatar’s bodies move as they move their physical bodies, through the virtual space interacting as they would in the physical world. We would stimulate a truer experiential learning environment involving more of the students’ senses.

In the group exercises, the nurse, nurse practitioner (NP), and patient would have the added dimension of physically moving as they talk to each other, hand each other objects,
use devices, as the NP examines the patient. For example, the patient would actually sit on the exam table and as the NP examines her, they would both be moving in their physical world to move their avatars. Learning how to physically manage to document with a tablet PC while you are examining a patient in a virtual space would allow for more confident interactions with real-world patients as students move out of the classroom.

In individual exercises, students could interact with devices in the virtual lab such as tablet PCs and patient testing devices, using them as they would in the physical world. Hands-on experience could be simulated in a more realistic manner both for manipulating devices used during the patient visit as well as EHR and PHR tools. It would be an exciting challenge to develop this demonstration ability to closely simulate the physical world.

**Scenario 3: Future Technology**

We can only imagine what technology will be available and used in the future, both for healthcare and for demonstrations. In this scenario, we hypothesize what technology and learning environments may exist in the future. Perhaps a virtual computer display and keyboard would be holographically projected in front of students who role-play as a patient or nurse to enter, and display for review, PHR and EHR data.

Students could learn how to use wearable (such as fabric or band-aids) home-care medical devices to collect data such as blood glucose level, blood pressure, heart rate, etc. A nurse could actually virtually visit a patient in their home, as a 3-D hologram, moving around the home to help the patient with home-care. Devices that give physical resistance could be developed to incorporate into a Wii-like device and virtual demonstration to help the student learn how to lift a patient without injury.

Adding the dimension of physical feedback to virtual learning and demonstrations could be valuable in preventing injury to the student once they move into the clinical environment. The benefit to students could also extend to improved understanding of the patient experience, perhaps by putting the student in the role of a cancer patient who has severe fatigue as a result of chemotherapy. Physical feedback pressuring the student's legs and body would simulate the walking-through-water feeling that a fatigued patient can experience during simple movements. This learning can help students clinical practice by providing a clearer understanding their patients.
Conclusion

Demonstrating the utility of technology for improving practice and education can be an effective facilitator of the rapid diffusion and adoption of educational and practice technologies. Specific benefits and outcomes of technology demonstrations are intended to support nursing professionals as they adopt IT in their practice environments. Further we should support nursing education curriculums as they create educational modules for nurses that are based upon informatics competencies. The nursing profession and other key stakeholders should embrace the integration of technology demonstrations into practice. Through the effective use of IT we can support nursing practice and improve patient outcomes by preparing a workforce that visualizes the benefits of transforming practice and education in our increasingly automated, informatics-rich, and consumer-driven healthcare-environment.
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new TIGER Virtual Learning Environment
As TIGER moves into Phase III and launches the new Virtual Learning Environment (VLE) please contact:

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