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Influence of Technology in Supporting Quality and Safety in Nursing Education



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KEYWORDS

- Distance education • Educational technology • Innovation • Professional education
- Quality of health care • Patient safety • Simulation

KEY POINTS

- The COVID-19 pandemic and the subsequent need for social distancing accelerated the adoption of technology-driven strategies for work meetings on video platforms and use of quick response codes for just-in-time training.
- During the COVID-19 pandemic, technology was an essential tool for nursing professional development practitioners in the training of nurses that were redeployed to in-patient care units and for education on new drugs and protocols used to combat the virus.
- The innovation and resolve of nurses adapting technology to meet educational needs during the COVID-19 pandemic confirmed that accelerated change does not have to compromise quality and safety.

INTRODUCTION

The influence of nurses continues to grow as they positively impact care at the bedside with patients and families and in the larger society where the profession of nursing continues to be among the most trusted.¹ The COVID-19 pandemic illuminated the dedication of nurses providing direct care to patients but also highlighted the high degree of innovation and problem-solving skills nurses possess as they worked within an overburdened system in real-time, providing cutting-edge care as it was being discovered, and stretching resources beyond what was imaginable. Nurses quickly adjusted processes and adapted new protocols for delivering safe, high-quality care.

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The COVID-19 pandemic was the great equalizer among nurses. Where seasoned nurses frequently guide newer nurses in managing care and learning unit protocols, all nurses faced the same steep learning curve to quickly understand detailed procedures for triaging the care of patients with COVID-19, follow unfamiliar treatment modalities, and manage resources while adhering to strict isolation protocols. The rapid and continual change ever present in health care was accentuated by the emergent needs of a society in crisis, and nurses along with all health care professionals were challenged to find innovative solutions to deliver high-quality, safe care to patients. Technology played a significant role in supporting that work.

QUALITY AND SAFETY COMPETENCY IN PROFESSIONAL DEVELOPMENT

Since the call to improve health care from the Institute of Medicine (IOM; now the National Academy of Medicine) and the development of Quality and Safety Education for Nurses (QSEN), nurses have assumed a greater role in ensuring the quality and safety of patient care. The competencies identified by the IOM² and further developed by QSEN called for a new identity for nurses that demonstrated knowledge, skills, and attitudes that emphasized person-centered care, teamwork and collaboration, use of evidence-based practice, quality improvement skills, and the integrated use of informatics and technology in the provision of care for patients.³ The American Association of Colleges of Nursing adopted those competencies in the development of *The Essentials: Core Competencies for Professional Nursing Education*,⁴ which now serves as the roadmap for competency-based education for nurses to provide a stronger bridge to practice in developing competent practice-ready nurses. The inclusion of these competencies in nursing education provides standardized structure for content development and assessment in the teaching-learning process in prelicensure nursing education programs so that all students can expect the same education and all employers can expect the same competencies from their new hires.

The integration of quality and safety into education offerings in both practice and academia places a stronger emphasis on *why* interventions are necessary and not just *how* to complete a skill. For nursing professional development (NPD) practitioners, quality and safety competencies provide a structured, standardized process for developing education, shifting the focus from teaching tasks to teaching concepts about how to impact and promote high-quality, safe care.⁵ Continuing education offerings, in-service programs, nursing orientation programs, and Transition to Practice programs remain integral processes in ensuring the competency of nurses in practice and come with a new reliance on technology as many health care settings shifted during the COVID-19 pandemic to online classes and virtual experiential learning. Not only has the setting for learning changed, but the education itself has shifted to include competency with informatics and health care technologies.

TECHNOLOGY'S INFLUENCE ON QUALITY AND SAFETY

As prominent as quality and safety have been in the evolution of nursing education, so has been the integration of informatics and health care technologies. Educational technologies including simulation and virtual simulation have created opportunities to emphasize and apply quality and safety competencies and have been instrumental in fostering a quality and safety mindset in nursing.⁶ Data drives practice, and the measurement of nursing sensitive indicators is now commonplace on patient care units. In the practice setting, NPD practitioners use dashboard data to identify needed continuing education based on performance reports that indicate areas where benchmarks are not being met and improvement is needed.

Nurses will need to develop expertise at all levels of education and practice in applying data to support national quality initiatives aimed at improving access to care as well as management of care. The *Future of Nursing Report 2020–2030* calls for health care systems to employ nurses with expertise in technology to use digital platforms, artificial intelligence, and other technological innovations to address social determinants of health and health equity.⁷ Training for these skills must begin in pre-licensure nursing education programs and be further supported in practice settings and advanced practice education if nurses are to appropriately use technology as not only a vehicle for learning but also a means for impacting the quality and safety of patient care.

TECHNOLOGY IN TEACHING AND LEARNING

The use of technology in all sectors continues to expand, significantly influencing the delivery of health care and the provision of health care education. The use of tablets and e-books rather than textbooks makes it possible for learners to have extended access to rapidly updated information. Active teaching strategies using technology to enhance learning have replaced outdated, stagnant methods from the past. These strategies support the engagement of the learner and promote adult learning principles of being self-directed, experiential, relevant, and problem-centered.⁸ Learner engagement is essential to knowledge and skill development as it has been linked to the enhanced retention and application of knowledge in the clinical setting.⁹

To meet the learning needs of contemporary nurses, the professional development paradigm is shifting from using traditional approaches in teaching to using interactive educational technologies.^{10,11} The result has been the infusion of innovative, creative, technology-focused teaching methods into curricula in both academic and practice settings. Although lectures, modules, and in-services have been the mainstay of nursing continuing education, the use of educational technology is now seen as an essential component in creating effective and engaging programs to enhance problem-solving, strengthen clinical judgment, and build skill application.¹²

DISCUSSION OF BEST PRACTICES FOR TEACHING QUALITY AND SAFETY USING TECHNOLOGY IN HEALTH CARE SETTINGS

Gaming

Gamification, or game-based learning, is an active learning strategy which uses a game to test the knowledge and skills of participants as they move toward achieving specific learning objectives. Game-based learning has been found to effectively enhance engagement with the added benefit of providing learners with immediate feedback.^{12–14} As a teaching strategy, gaming meets the learning needs of many, especially members of Generation Z (those born after 1995) who are thought to be digitally native learners, as they often require interactive strategies to foster motivation, confidence, and judgment skills.¹⁴

Game-based learning is an approach whereby game elements are applied to nongame situations. A game model is chosen to serve as the template; these may include board games like Bingo, or popular electronic games such as Kahoot. Kahoot is a free online quizzing tool that can easily be used to assess learners' knowledge about topics such as dysrhythmia interpretation and management, wound assessment and staging, and medication administration practices. Educators insert the content which is presented as a quiz to learners who then select answers via their mobile device. After students select the answer from the choices, correct answers and aggregated response results from participants are displayed on the quiz screen.

Broadly familiar games such as *Jeopardy!* or *Who Wants to Be a Millionaire?* can be downloaded in an electronic template format for educational gaming. Instead of trivia content, instructional content is inserted in the template to meet learning objectives. These games are guided by rules and can accommodate individuals or many players. Healthy competition occurs as players use their knowledge and skills to correctly answer questions and gain points. Those with the highest scores are often designated as the “winners,” and prizes may be awarded. Games are an effective way to incorporate visual, auditory, reading, and kinesthetic learning preferences.¹² Gaming can also be used to support competency in teamwork and collaboration as it can be completed in interprofessional settings with multidisciplinary health care providers participating.

Gamification is an innovative approach to sustain engagement and interest in learning while providing a safe and functional environment for education. Gamified education has been shown to positively influence motivation and knowledge retention.^{12,14} Through active participation, continuous feedback, challenging content, and rewards, learners become immersed in the topic, resulting in increased knowledge and expansion of skills.¹⁴

Simulation and Role Play

Simulation is now commonplace as a strategy to educate and enhance the competence of health care professionals in a controlled setting. The standards established by the International Nursing Association for Clinical Simulation and Learning (INACSL)¹⁵ provide evidence-based guidelines for best practice in simulation, and many nurse educators working in simulation obtain the Certified Healthcare Simulation Educator designation as part of their professional responsibility as this specialty grows.

Simulated learning is a structured process that begins with prebriefing, during which facilitators set the stage for the learning activity by reviewing learning objectives, goals of the session, participants' roles, and equipment to be used as they orient groups to the environment and explain the evaluation process.¹⁶ It is followed by the actual simulation experience where the learner assumes a role and interacts with the focus of the learning activity. The final step is debriefing, during which the simulated scenario events are analyzed as learners are guided to reflect on their individual and group performance. During debriefing, gaps in skills are identified, and constructive feedback is provided. Simulation experiences can use low-fidelity manikins that have limited functionality or high-fidelity manikins that can be programmed to provide vital signs, pulses, cardiac rhythms, hemodynamic monitoring, and even verbal communication. The most realistic simulations use standardized patients. These individuals are carefully trained to adopt the characteristics of actual patients with specific conditions. Standardized patients realistically portray different disorders and their presentations vary based on learner roles, responses, and performance.

Simulation is widely used as a vehicle to enhance knowledge and skills appropriate to individual disciplines. In addition, the role-play aspect of simulated learning supports achievement of learning outcomes in the affective domain, which impacts learner attitudes and emotional growth and development. Adding varying degrees of complexity and enhanced technology can accommodate learning needs at all levels from novice to expert. Learning scenarios can be planned and sequential or can be unstructured and improvised; unstructured scenarios allow for spontaneous interaction between participants. Those not actively assuming a role in the simulation are considered observers and are encouraged to provide constructive feedback during the debriefing session after the scenario is completed.

Interprofessional simulations have been shown to enhance teamwork and collaboration as well as communication skills.^{16,17} Too frequently, communication

breakdowns occur in health care settings, putting patients at risk. Simulation with role play provides the opportunity to evaluate communication skills while providing participants with real-time feedback as they identify ways to enhance clarity. Learners see how communication styles impact information received by others and how improved communication builds confidence and trust that can positively influence teamwork and collaboration and guard against errors. With both simulation and role play, educators can allow the learning experience to be repeated after debriefing has occurred so that participants can immediately incorporate feedback they have been given. This frequently results in better outcomes, improves team interactions, and provides learners with effective strategies to use in their practice. Interprofessional team members work through the scenarios together, fostering critical thinking and emergency management skills. Learning through simulation is impactful as effective interprofessional teams are linked to better patient outcomes, fewer errors, and enhanced quality, safe care delivery.¹⁶ Even when face-to-face simulation is not practical, interprofessional education and practice can continue through the use of electronic communication platforms.

Virtual Patient Simulation

Aspects of simulation and gaming are combined in virtual patient simulation. These interactive digital simulation platforms require licensing agreements that are purchased for institutional use and provide learners with an interactive way to experience virtual clinical scenarios without fear of harming patients. As this market grows, there is a wide selection of patient scenarios to support clinical learning that can be basic, such as respiratory assessment or complex, such as a pulseless patient or a patient experiencing an allergic reaction. Learners navigate through assessing, diagnosing, stabilizing, and teaching patients. At the conclusion of the scenarios, learners can evaluate how the selected interventions altered the outcome and impacted the delivery of quality care. Evidence-based practice, national safety standards, and social determinants of health are incorporated as the learner cares for a diverse population of patients. Users earn digital clinical experience scores as they successfully navigate the virtual patient scenario, enabling nurse educators in academia and NPD practitioners to evaluate the decision-making and clinical reasoning skills of individual learners. Debriefing after a virtual simulation supports the development of nursing knowledge and clinical judgment skills.

Immersive virtual reality simulation

Immersive virtual reality simulation is a newer and expanding form of advanced technology that provides an experiential simulation platform using a three-dimensional, computer-generated environment to replicate real-life experiences for the learner.^{18,19} Learners may wear headsets, goggles, or use haptic sensors (tactile sensors) to replace environmental sensory inputs (auditory, visual, and tactile), creating a more authentic sense of interaction in real time with patients in a virtual world.

A systematic review of the effectiveness of virtual reality simulation as a learning tool in nursing education found it to be effective in improving cognitive performance and psychomotor skills.¹⁸ This technology has been used successfully to educate health care providers about situations that are not commonly experienced but for which caregivers must be prepared for, such as high-risk deliveries, postpartum hemorrhage, and shoulder dystocia. Wu and colleagues²⁰ identified that past learning experiences positively affect learning outcomes related to virtual reality simulation, suggesting that nurse educators should use a variety of learning methods in meeting learning outcomes.

This newer technology has been found to be effective in nursing education regardless of the age, gender, or expertise of the learner, but barriers do exist.¹⁸ A safe physical environment with open space should be available. Prescription glasses can make wearing headsets uncomfortable, and simulator sickness can occur. Choi and colleagues¹⁸ reported left-handed players having difficulty with hand controls and a limited selection of available scenarios, identifying a need for more immersive virtual reality simulation scenarios to be developed for nursing education.

Technology and Nursing Skill Laboratories

Skill laboratories, like simulation, provide learning opportunities in a controlled setting where harm to patients cannot occur. The rapidly changing landscape of health care in conjunction with the continual influx of new equipment, policies, and procedures requires nurses to be technically adept. Skill laboratories afford nurses the hands-on opportunity to acquire new skills, maintain existing skills, and learn how to safely operate equipment. Learning to effectively and efficiently navigate electronic health records and electronic medical records is a critical skill that is particularly challenging to develop. Skill laboratories provide an opportunity to work within the institution's electronic health care system in a nonthreatening, unhurried environment to gather essential information required to provide safe care, while gaining confidence in one's technical skills.

Many institutions hold annual skills fairs to ensure staff maintain competency in common nursing practices as well as those skills that are infrequently used but critical when needed. Evidence-based practice, quality, and safety are reinforced with annual competency demonstrations that include indwelling urinary catheter insertions, central venous catheter dressing changes, peripheral IV insertions, application of emergency code-cart pads, and use of critical equipment, such as smart pumps and defibrillators. During the COVID-19 pandemic, much of this type of skill reinforcement was moved to online platforms for reviews, and nurse educators quickly adopted processes to take the actual hands-on skills training to the bedside and the units where nurses were working.

Just-in-Time Training

Just-in-time training is an approach that provides easily accessible education at the time it is needed. It is a type of microlearning where targeted education is provided in small learning units to review specific tasks, when “on-the-spot” training is required.²¹ With just-in-time training, nurse educators or clinical experts support nurses by enabling them to practice new procedures just before performing them on patients. This process fosters learning, provides clinical support, mitigates errors, enhances patient safety, and promotes quality care delivery while improving confidence and self-efficacy.

An innovative way of providing just-in-time training is the use of quick response (QR) codes. The QR code is a small black and white image much like a barcode (**Fig. 1**). Once the image is scanned with an electronic device, such as a smartphone, the learner is directed to a specific educational destination.²² The use of QR codes links nurses to specific websites, equipment videos, clinical updates, and new procedure demonstrations. The QR code technology is an effective tool for providing nurses with immediate access to needed information.

During the COVID-19 pandemic, just-in-time training was successfully implemented for nurses who needed to quickly learn how to prone critically ill and non-critically ill patients. It also was effectively used for nurses redeployed to understaffed high-acuity care settings as a way to provide education about new procedures or unfamiliar

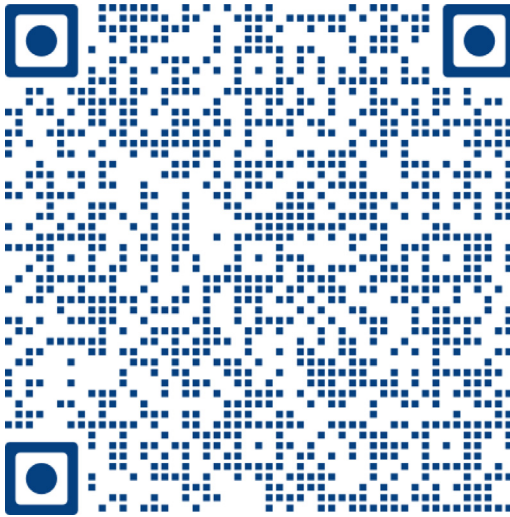


Fig. 1. Vacutainer safety mechanism education QR code. (Developed by Patricia Duddy, MSN, RN, MBA, Nurse Manager NEPD Einstein Healthcare Network & Nicole Pecoraro, MSN, APRN, AGCNS-BC, CMSRN, Clinical Nurse Specialist, Einstein Healthcare Network.)

equipment. Through just-in-time training, nurses were able to demonstrate or talk through a new procedure before performing it on their patients. By doing so, nurses had more confidence, reducing the likelihood of errors. Just-in-time training is an example of nurses' adaptability to ensure quality and safety competencies are being implemented in the delivery of evidence-based patient care.

Electronic Communication Systems

NPD practitioners are charged with providing the needed education in creative and innovative ways amid the constraints of unit census expansions, inflexible nursing schedules, high patient acuity, and diverse learning needs. The traditional way of providing education in the classroom setting has become ineffective and inefficient; conventional methodologies are not responsive to the rapid changes in the work environment, often leaving staff without needed information in a timely manner. An alternative approach to education, with enhanced responsiveness and flexibility, is e-learning and electronic communication systems.²³

Electronic communication systems have become integral to clinical practice and clinical education. A selection of an electronic communication system depends largely on the goals and learning objectives for an activity as well as available resources. Examples used for group learning include standardized learning management systems such as Blackboard or Canvas and audience response systems such as Kahoot or Poll Everywhere. For individual learning, podcasts, videos, webinars, and text messaging are useful. With the increasing number of available electronic systems, NPD practitioners have more educational tools at their disposal to promote engagement, learning, and knowledge retention.

Video conferencing platforms make it possible for more people to attend meetings and in-services, although engagement is challenged when attendees do not turn on cameras and unmute their microphones. Leading or participating in a video conference requires understanding of appropriate etiquette such as raising a hand to queue

up to speak and awareness of one's visual background and on-camera activity, but they also provide engaging features such as capability to share screens, share documents, and enable real-time collaboration. Learners can be placed in small groups or work independently for a period during the video conference. Some platforms allow for audience polling, which promotes engagement and enables the NPD practitioner to assess the knowledge level of the group. Throughout the COVID-19 pandemic, hospitals successfully used video conferencing platforms to deliver essential didactic education virtually, including trauma and critical care courses and specialty certification review courses.

During the COVID-19 pandemic, video conferencing platforms provided the format for many Transition to Practice and nurse residency programs. The ability to place individuals in groups to work in breakout rooms and then later have them rejoin the larger group allowed for implementation of interactive learning strategies even though the meetings were virtual. An example of this is an exercise in which nurse residents work in small groups of four. Each group is assigned a specific evidence-based practice bundle to research, such as the central line-associated blood stream infections, catheter-associated urinary tract infection, or clostridium difficile infection bundle. Nurse residents work in their small groups, searching established health care Web sites for information about their designated evidence-based practice bundle. Each group has 25 minutes to learn the bundle well enough to teach it to others. The small groups then rejoined the larger group and provide presentations to peers. This creates an interactive learning experience where nurse residents can still work with peers on their assignments yet come into the larger group for questions and further discussion. Through this process, technology supports innovative teaching strategies that might not be used under other circumstances.

Learning management systems such as Blackboard and Canvas have long been part of academia but have recently been used in clinical practice settings to disseminate educational modules to nursing personnel. The changes due to COVID-19 created needs for social distancing and time limitations for education, prompting NPD educators to use these systems to provide didactic material before attending skills sessions. Using learning management systems in this way assisted nurses with completing online pre-work before attending face-to-face required training. In this way, in-person course time was devoted to demonstration and return demonstration of skills. Blending online learning modules with in-person skill demonstrations has been successful in maintaining the on-going and continuous education of direct care nurses.

ACCELERATION OF CHANGE IN TIME OF CRISIS

Health care professionals and organizations throughout the world were confronted with unprecedented challenges stemming from the COVID-19 pandemic. As COVID-19 emerged and worsened, the World Health Organization quickly declared it a global pandemic.²⁴ It became abundantly clear to health care organizations that quick operational changes were needed, and strategic plans for implementation of the changes were crucial. Technology was essential in disseminating the plan and meeting the educational needs of those providing care.

Within short windows of time, hospitals were filled beyond capacity with patients critically ill with the novel COVID-19 virus. Clinical units were transformed into additional critical care units, requiring nurses with critical care skills to care for these patients. Nurses from various specialties, such as surgical services, required immediate education to be safely redeployed to inpatient settings to take clinical assignments.²⁵ The crushing volume of patients continued for months, straining health

care system resources and the resolve of health care providers. The unrelenting stress and physical exhaustion had profound negative effects on health care providers as they struggled to provide safe care amid dwindling supplies, insufficient staffing, emotional strain, fear of personal illness, and uncertainty about the future.

Hospitals developed command centers to provide leadership and guidance to all employees. It became essential for health care organizations to rapidly implement continuously changing safety protocols to meet regulatory requirements. In addition, in an attempt to combat the virus, the Food and Drug Administration authorized the use of multiple drugs to combat the virus, and many of the drugs were unfamiliar to health care providers. Numerous Emergency Use Authorizations were approved, requiring intense education to ensure safe administration of new medications. Educational demands were high, requiring the daily dissemination of frequent clinical changes, new guidelines, new procedures, and new restrictions.^{26,27}

NPD practitioners were greatly impacted as the demand for education far exceeded the capacity of many NPD departments.²⁶ The need for maximal clinical support took priority over other responsibilities. As a result, many NPD practitioners were providing direct care for patients, serving on proning teams, and assisting nursing staff on clinical units. Although many education programs were suspended, nursing orientation and residency programs continued because of the need to onboard as many nurses as safely possible. Without question, all of these changes required modifications to the daily workflow of NPD teams. Despite the frenzied pace brought forward by the pandemic, quality and safe care remained a nursing priority.

NPD practitioners quickly evaluated all educational programs and in-service education requests. Prioritization strategies were developed to best meet the needs of the nursing department; immediate direct patient care training took precedence over all requests. Strict social distancing guidelines from the Centers for Disease Control and Prevention (CDC) prohibited most in-person classes from safely taking place. Technology provided a way to meet educational needs while also mitigating the spread of the COVID-19 virus. Training programs were rapidly transformed into virtual models. Video conferencing became the communication platform used for nursing orientation and all educational offerings. Breakout rooms, online simulations, videos, and webinars were used to meet learning objectives. Nursing skill laboratories required reorganization with staggered start times to limit the number of staff present in the laboratory at any one time.

Just-in-time training became the mainstay as NPD practitioners were working side by side with direct care nurses on patient care units. QR codes provided quick and easily accessed educational resources. Learning management systems were fully used as learning modules were quickly developed and widely disseminated to nursing staff. These systems proved an efficient way to quickly reach the extensive number of nurses requiring information to provide safe and effective care. The chaos of the COVID-19 pandemic created tremendous opportunities to accelerate change with innovation and creativity.

FUTURE INITIATIVES TO BRIDGE ACADEMIA AND PRACTICE

Technology in health care continues to evolve. The patient safety movement began with *To Err is Human*²⁸ and brought about innovative solutions that included patient care machinery with hard stops to prevent patient harm, advanced monitoring and alarm systems, and barcoding to prevent medication administration error. Patient harm was mitigated by evidence-based best practices, the initiation of checklists and timeouts, and a hypervigilance and preoccupation with error, driven by financial

incentives to maintain quality and safety standards. It is hard to know the full impact that the COVID-19 pandemic will have on the health care system, but it is clear that the nursing profession met the extreme challenges with innovation and resolve and confirmed that accelerated change does not have to compromise quality.

Moving forward, partnership between academia and practice will be vital if schools of nursing are to produce an adequate number of practice-ready graduates to meet the health care needs of a traumatized society. The increased need for nurses will make it essential for academic institutions to find ways to prepare a greater number of individuals despite dwindling clinical sites, inadequate numbers of nurse faculty, and limited institutional resources. Technology will most certainly be part of that solution as classes continue to expand to online venues and virtual patient simulations provide opportunities to gain nursing knowledge and clinical experience, but considerations about different learners' level of comfort and knowledge of technology will need to be addressed. Although today's learners who are entering college are generally considered digital natives, the majority of their experience is based in mobile device applications, and it should not be assumed that these learners will naturally be proficient in educational technologies.²⁹

The idea of being practice ready will include not only the ability to navigate technology in the patient care setting but will also require that bedside nurses can interpret data and effectively use dashboards to understand where improvement is possible so that practitioners can seek novel and innovative solutions to individual and systems problems. Hospital education departments will need to examine their technologies and consider how they can be used to improve care. Budgetary considerations should include academic–practice partnerships that share technology in the form of state-of-the-art simulation laboratories and immersive virtual reality systems for cost containment. The potential benefits of simulation applied to all areas of health care including mental health and primary care will need to be explored. Instructional design and Internet technologies departments will need to be expanded to manage an increased volume of support services, and planning will be required to maintain operations in the event of system failures.

The need for academic–practice partnerships was accentuated in the wake of limited student interaction with patients and the health care system due to the COVID-19 pandemic and clinical learning restrictions imposed to prevent spread. The impact of that limitation is yet to be realized. In addition, many clinical sites limit student access to computer systems to prevent breaches of privacy and systems security, hindering the learning experience.²⁹ Nursing programs and clinical partners will need to combine efforts to ensure that the integration of technology in nursing education is supported in the classroom as well as the clinical setting to assist the transfer of knowledge from the classroom to the patient bedside and ensure learners can navigate practice-setting technology. To prepare practice-ready professional nurses of the future, innovative and creative technology-focused teaching methods must be incorporated into curricula in both academic and practice settings as a vehicle for learning as well as a means to impact quality and safety of patient care.

SUMMARY

To promote positive patient outcomes and excellent care delivery, infusing quality and safety competencies into all educational offerings and practice expectations is essential. Despite the unprecedented obstacles stemming from the COVID-19 pandemic, NPd practitioners and nurse educators successfully harnessed educational technology to disseminate an extraordinary amount of vital information needed to provide care to a world in crisis. The agile adoption of educational technology allowed rapid

access and dissemination of information that carried institutions through the uncharted waters of the pandemic and created a roadmap for mass education techniques to guide not only future disaster preparedness and crisis intervention but also application of nursing education in all arenas.

CLINICS CARE POINTS

- Nursing practice requires that nurses be competent in informatics and health care technology, and academia has responded by making it a core competency of nursing education.
- Technology in nursing education enhances learner engagement through gamification of learning, simulation, and immersive virtual learning experiences.
- Electronic communication systems make it possible to provide remote education and training to large numbers of learners with increased flexibility.
- Changing the process of education delivery will require increased investment in instructional design and information technologies support.
- Building and strengthening academic–practice partnerships is a key component in developing practice ready nurses with strong technological skills.

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