Forecast for the Future
Technology Trends in Nursing Education

Wolters Kluwer

WOLTERS KLUWER AND THE NATIONAL LEAGUE FOR NURSING (NLN) have jointly conducted the Future of Technology in Nursing Education survey—first in 2016 and the latest survey conducted in 2021. It would be an understatement to say nursing education has changed since the first survey five years ago. To learn about and understand the shifts related specifically to the COVID-19 global pandemic and beyond, we surveyed nursing deans, program directors and faculty to identify their plans for technology usage, adoption, and investment during the next five years and explore the barriers and opportunities related to those plans.

In many ways, the results were predictable: We saw a rapid transition from in-person learning to virtual learning. Some 73% of institutions went fully online at the start of the pandemic. Technologies that aid in remote learning all had significant increases in adoption—even, perhaps, at the expense of other technologies.

State nursing boards have also played roles in increasing the use of technologies during the pandemic. While there was widespread adoption of virtual simulation due to the pandemic, these technologies had already matured to the point where they were producing comparable end-of-program educational outcomes as compared to traditional clinical hours.*

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Some of the survey results were expected given the environment, but certain complex themes emerged, too. For example, at the same time that they're navigating virtual learning, educators are also trying to accommodate the curriculum changes needed to prepare students for the Next Generation NCLEX® (National Council Licensure Examination). But even though changes are a priority, 40% of respondents say they have not yet decided what changes to make.

While the results paint a picture of individual technology investments, there's an opportunity to look more holistically at how these diverse technologies can work together to give students an entirely different learning experience. For educators, working with and investing in technology can help with several of the challenges today's faculty face with logistics, coordination, not enough time, and meaningful assessments of students' cumulative performance as they learn. Ultimately, technology helps educators prepare students for practice and the ability to apply their knowledge in clinical settings. It's a new education paradigm that will be supported by existing and emerging technologies.

* Hayden, J.K., Smiley, R.A., Alexander, M., et.al. 2014. The NCSBN National Simulation Study: A Longitudinal, Randomized, Controlled Study Replacing Clinical Hours with Simulation in Prelicensure Nursing Education, Journal of Nursing Regulation, Volume 5, Issue 2.

Fidelity, Funding, and the Future

WHILE THE COVID-19 PANDEMIC ACCELERATED THE USE OF TECHNOLOGIES BY NURSING SCHOOLS, many of the adoption trends had been gaining momentum over the past several years. Since 2016, when Wolters Kluwer and the National League for Nursing (NLN) first conducted the survey, nursing programs were already using a wide range of online learning tools.

The survey finds that prior to the pandemic, some 65% of classes were being conducted in brick-and-mortar classrooms, with 20% offering hybrid models (in-person/online) and 11% primarily online. That model quickly flipped to online learning (73%), with another 22% offering hybrid models.

Predictions for post-pandemic learning? It is expected that at least some of these increases in online learning will continue longer term, with nearly one-third saying their programs will offer the same level of online content as during the pandemic and 39% reporting they plan to offer more online courses.

Respondents believe that simulation also will play a growing role in nursing education. Not surprisingly, 91%
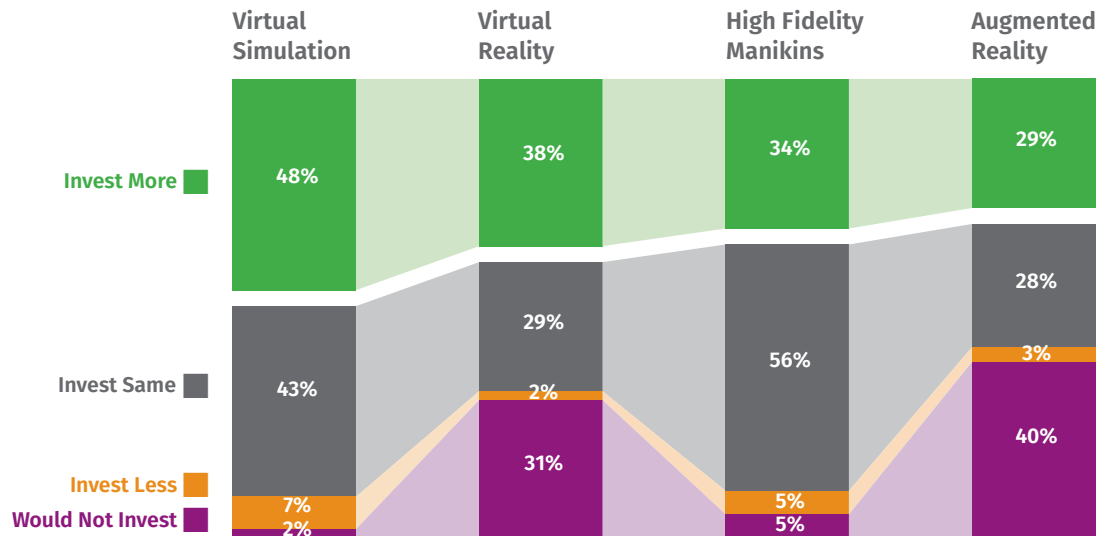
FORECAST OF ONLINE COURSES POST-PANDEMIC
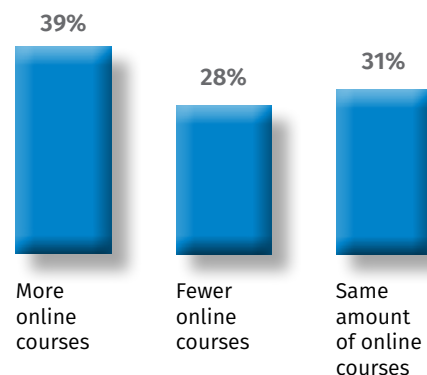
39%	28%	31%
More online courses	Fewer online courses	Same amount of online courses

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

of respondents are currently using virtual simulation. Some 48% of respondents say they plan to invest more in virtual simulation during the next 2 years, with virtual simulation reaching full adoption by 2025. Although augmented reality and virtual reality are still more-distant investment areas, they are on the radar of Bachelor of Nursing (BSN) programs in particular.

SIMULATION INVESTMENTS OVER NEXT 2 YEARS

	Virtual Simulation	Virtual Reality	High Fidelity Manikins	Augmented Reality
Invest More	48%	38%	34%	29%
Invest Same	43%	29%	56%	28%
Invest Less	7%	2%	5%	3%
Would Not Invest	2%	31%	5%	40%

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

There are also certain concerns, according to respondents. With the shift to online learning, nursing faculty are worried about how to best educate new students using different technologies. Indeed, 68% of faculty recognize that they are not adequately trained in the new technologies.

They also recognize that students are interested in more diverse learning and support options. After all, the profile of digital native learners is markedly different from that of prior generations. Today's students are relying more heavily on digital tools and technologies, and faculty are responding by finding the right resources to meet today's demands and all of the changing generational characteristics.

Another top concern is the number of high-risk students in nursing programs, which respondents say is increasing. Nursing schools have long recognized the need to support students who are at risk of failure in the nursing program or on the NCLEX. In fact, the number of respondents who agree that more students are high-risk (81%) increased by 10% over the 2016 number (71%).

Finally, lack of funding is a growing obstacle to technology adoption, with an increase to 67% in 2020 from 49% in 2016. According to qualitative interviews, some of the lack of funding is being driven by institutions diverting funds to institution-wide infrastructure investment caused by the pandemic.

NURSE EDUCATORS SEE RISE IN HIGH-RISK STUDENTS

The number of high-risk students in nursing programs is increasing.

81% Agreed 2021
71% Agreed 2016

10% Increase

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

The Classroom of the Future: Virtual, Secure, and Data Driven

The classroom of the future is likely to be a hybrid environment, with 39% of survey respondents indicating that their institutions plan to offer more online courses post-pandemic. Learning environments will leverage next-generation technologies and increase investment in secure exam delivery systems as they look to ensure the integrity of students' test results.

According to respondents, technologies that have been adopted at a faster pace than expected—because of the pandemic—will continue to be adopted through 2025. The pace of adoption may differ depending on technology, but indications are that many of these and other technologies will achieve full adoption (75% or greater) by 2025. Even a number of less-widely used adaptive technologies will become mainstream in more than 50% of programs.

Factors for Technology Adoption

The shift to virtual learning had been happening well before the COVID-19 pandemic. The increased use of new technologies in education comes in response to a shortage of clinical sites and demonstrates a progressive approach to meeting the demand for practice-ready nurses who are prepared not just to pass licensure exams but also to deliver hands-on patient care. Digital learning has grown in popularity and with it, new and creative ways to engage students in assessing, acquiring, managing, and applying knowledge.

PREDICTIONS FOR NURSING TECHNOLOGY ADOPTION 2025

Full Adoption by 2025
(>75% adoption)
1. Virtual Simulation
2. Online/Distance Learning
3. Learning Management System
4. Video for Skills (local or online)
5. Secure Exam Delivery
6. Adaptive Quizzing
7. EHR Applications
8. FaceTime/Video Conferencing

Mainstream Adoption by 2025
(<50% to >50% adoption)
1. Virtual Reality (+39%)
2. ePortfolio (+35%)
3. Mobile Apps (+33%)
4. Video Capture Software (+32%)
5. Integrated Digital Curriculum (+16%)

Emerging Adoption by 2025
(large increase, but <50% adoption)
1. Makerspaces* (+29%)
2. Wearables (+28)
3. Data Analytics (+28)
4. Artificial Intelligence (+24)
5. Augmented Reality (+23)
6. Social Media (+13)

A Makerspace is a collaborative work space where people with shared interests, especially in computing or technology, can gather to work on projects while sharing ideas, equipment and knowledge.

80,521

The number of qualified applicants turned away by US nursing schools in 2020 due to insufficient numbers of faculty, clinical sites, classroom space, clinical preceptors, and budget constraints.[1]

But just as the lack of clinical sites continues to be a pressing concern, there has been an increase in virtual simulation, which delivers realistic patient encounters where students are responsible for making a variety of clinical-reasoning decisions.

While simulation has been used for years in nursing education, it has changed over time. These changes, combined with the requirement for virtual learning during the pandemic, have facilitated wider adoption of virtual simulation and the teaching of electronic health record (EHR) use.

In fact, although the high use of online learning and virtual simulation during the pandemic has been unsurprising, what was unexpected is the future potential adoption of EHR applications and the fact that academic EHR application use as part of nurse training is only used 60% of the time in classrooms and simulation labs, according to the survey.

Given the drive toward virtual simulation training to create more lifelike interactions for students, integration with academic EHR applications and other evidence-based point-of-care tools will become increasingly important. Indeed, training on use of EHRs as part of the curriculum has long been highlighted as crucial to ensuring nurses can use EHR technologies and best practices in clinical practice.

Two other factors driving technology adoption are

"When I'm in a clinical setting and I'm the nurse or faculty member who's supervising a student and I look and I see she's going to make a mistake, I step in right away to stop; safety comes first.

"In simulation, the student gets to make the mistake, and then they get to understand what the mistake causes; that imprints in a very different way to help them understand the consequences and to help them not make that mistake again."[2]

—Dr. Desiree Hensel, Dean of Curry College School of Nursing, Milton, MA

the need to increase clinical judgment skills and the need to better prepare students for practice. Those prioritizations undoubtedly reflect the focus of the Next Generation NCLEX project (NGN), which has the goal of better assessing students' clinical judgment skills. NGN incorporates case studies like those seen in real-world situations that (1) reflect the kinds of critical decisions nurses have to make in a variety of healthcare settings, and (2) add fidelity to the assessment.

Reasons for Technology Adoption

| Pandemic changing education models | Reduction in number of available clinical sites | To increase clinical judgment skills | To better prepare students to be ready to practice |

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

3 Barriers to Technology Adoption

1

2

3

The Funding Conundrum

Nursing deans are facing significant budget cuts as schools seek to invest in technology infrastructure and divert funds to handle the changes caused by the pandemic.

Getting Connected

Respondents reported the lack of technology infrastructure–both at the nursing program and available to students outside the program's physical site–as key barriers.

Change Challenges

Many of the more-senior faculty who may have been planning to retire in 3 to 5 years are opting to retire now rather than learn a completely new way of teaching. This creates a challenge in filling open positions to meet increased demand.

1 **The Funding Conundrum**

Of concern to survey respondents is the question of who funds technology investments. Funding continues to be viewed as an obstacle to technology adoption. However, nurse educators also indicate that it is not just funding from the institution but—in their view—also resistance by students who do not want to have to pay for new technologies. To combat this funding problem, nurse educators support government grants to increase technology adoption, just as they did in 2016.

The challenge to institutions is how to balance technology adoption with the cost of education for students.

Top Factor for Lack of Technology Adoption is Funding

67%
Blame lack of funding for the main reason that technologies are not being adopted

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education
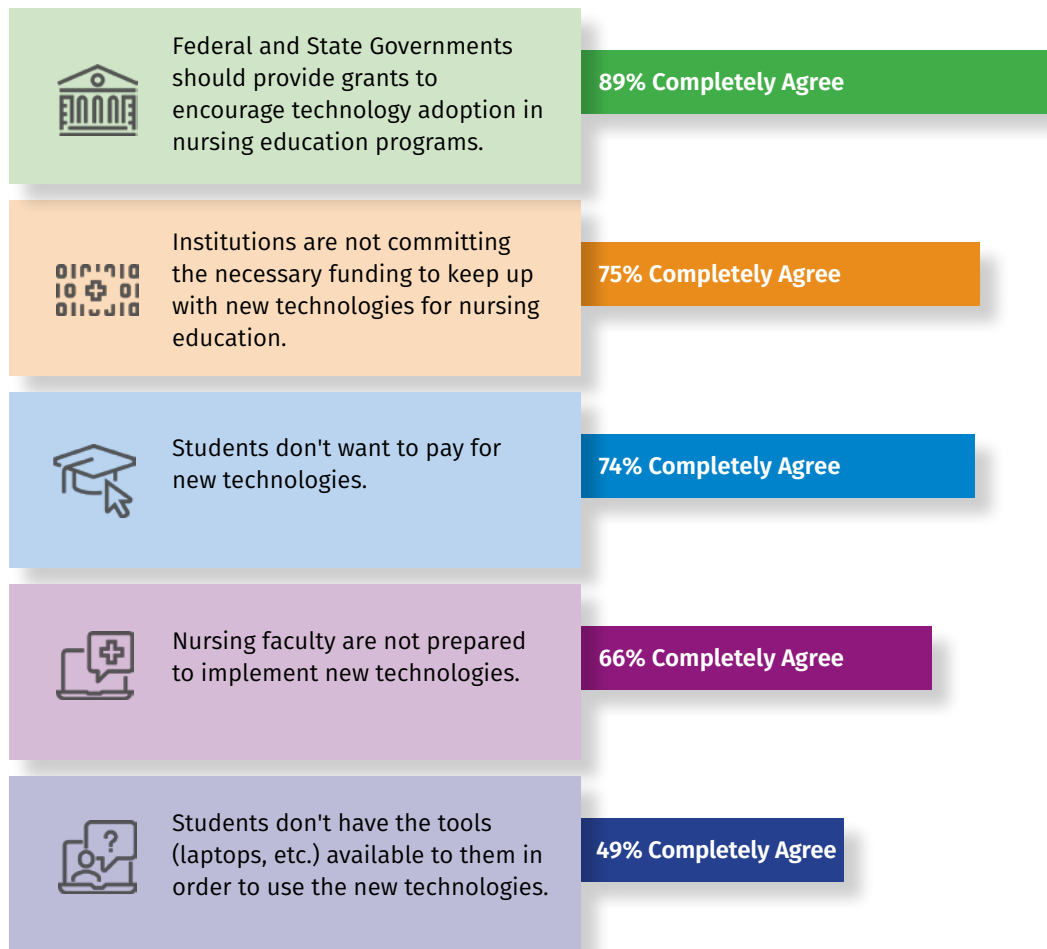
2 Getting Connected

Shifting technology investments to students is not seen as an option, according to respondents. While educators report an inability or unwillingness for students to absorb the cost of technology, they also report that students don't have the tools available to them in order to use new technologies.

But are institutions in sync with student technology use? In a separate Wolters Kluwer survey of nursing students conducted in 2020,[3] students preparing for the NCLEX reported that digital learning resources reduced their anxiety in taking the exam (55.4%) and improved their confidence in preparing for it (52.7%).

But while student device usage is significant, there is work to be done to better understand the limitations on students' ability to invest in technologies and the best path forward to scale the use of those tools. Students' willingness to engage via technology is supported by data that shows most people today own devices. For example, about 88% of Gen Z have access to a desktop or laptop computer[4]; 98% own a smartphone[5]; and more than half (52%) report their smartphone is their most important device.[5]

TECHNOLOGY IN NURSING EDUCATION: WHERE INSTRUCTORS AGREE

Federal and State Governments should provide grants to encourage technology adoption in nursing education programs.
89% Completely Agree

Institutions are not committing the necessary funding to keep up with new technologies for nursing education.
75% Completely Agree

Students don't want to pay for new technologies.
74% Completely Agree

Nursing faculty are not prepared to implement new technologies.
66% Completely Agree

Students don't have the tools (laptops, etc.) available to them in order to use the new technologies.
49% Completely Agree

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

3　Change Challenges

Beyond funding, another potential reason technologies may not be adopted is that faculty may be reluctant to change their approach to teaching. Some studies show faculty are generally slow to adopt changes that deviate from the traditional classroom lecture.

While the survey findings suggest that as nurse faculty are embracing some innovation, some are still reluctant to change their approach.

Further, many of the more-senior faculty, who may have been planning to retire in 3 to 5 years, are opting to retire early rather than have to learn a completely new way to teach.

WHAT STANDS IN THE WAY OF TECHNOLOGY ADOPTION

Lack of technology infrastructure at the nursing program	Faculty not wanting to change their approach to teaching	Lack of technology infrastructure available to students outside of the program's physical site

Source: Wolters Kluwer and National League for Nursing: Future of Technology in Nursing Education

Technology: Part of the Future

Nursing education faces extraordinary challenges—from faculty shortages to difficulties in finding clinical sites. These challenges are compounded by the growing number of at-risk students as well as evidence that there is a need to improve nursing students' clinical judgment skills to prepare them for practice. These challenges existed well before COVID-19, but have become more critical since the pandemic began. The question remains: how pervasive will these technologies be once students are "back in the classroom" and will the shift to remote learning accelerate digital adoption? The survey results point in that direction.

Technology, in part, holds the key to adapting to how today's students learn. Improving the fidelity

of experience in simulation is a priority for most programs and will help enhance clinical capabilities in real-world settings.

Programs will have to assess how the technologies they use and the training they provide will give the majority of students the best chance of a successful learning experience, preparing them not just for NCLEX testing but—as important—for clinical practice. Certainly, the Next Generation NCLEX coming in 2023 is one step in making inroads in assessing clinical judgment. And whether they participate in education delivered in person, online or in a hybrid setting, future nurses must gain the knowledge, skills, and abilities to not only be successful on the NCLEX but also in practice is imperative as we move forward.

References

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2. Bonsall L. Reshaping Nursing Education. Lippincott NursingCenter Blog. https://www.nursingcenter.com/ncblog/september-2020/reshaping-nursing-education.

3. Wolters Kluwer 2020 Student Market Survey, April 2021.

4. Pew Research Center. Teens, Social Media & Technology 2018.

5. Global Web Index. 98% of Gen Z Own a Smartphone - GWI (globalwebindex.com).

Methodology

WOLTERS KLUWER carried out 6 in-depth interviews with qualified nursing respondents in August 2020, followed by a quantitative online survey sent out in December 2020.

The purpose of the study was to understand technology trends. The online survey was sent to a Wolters Kluwer list of nursing administrators, faculty, and Deans provided by the National League for Nursing, yielding 450 responses.

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