

# The impetus of COVID-19 in transforming nursing education through informatics

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## Introduction

The use of technology in nursing education and practice is not new. However, the COVID-19 pandemic created unique conditions during which faculty had to swiftly adapt to a predominantly digital form of education delivery (Morin, 2020). Some nurses providing direct patient care also had to adapt to virtual health care delivery. Before the pandemic, the need to prepare nursing students for working with digital technologies once they enter the workforce had been emphasized. For example, the National League for Nursing (NLN, 2015) posited that “nursing curricula and teaching strategies need to teach with and about technology to better inform healthcare interventions that improve healthcare outcomes and prepare the nursing workforce” (p. 4). In Canada, the national accrediting agency for undergraduate nursing programs (Canadian Association of Schools of Nursing [CASN], 2015) articulated a similar position, stating that nursing students must be competent to work with digital tools to support patient care and communicate with the interprofessional team. We conducted a focused ethnography that aimed to explore nursing faculty experiences related to integrating digital tools to support undergraduate student learning and developing their informatics competencies. This paper focuses on the subset of faculty who were interviewed during the COVID-19 pandemic. A second paper reports on additional data from this larger study.

## Background

Several studies report that nursing students are entering the workplace with gaps in knowledge relating to the use of digital tools and the management of information (Brown et al., 2020; Choi & De Martinis, 2013; Nagle & Clarke, 2004; Nagle et al., 2020a; Shin et al., 2018; Thompson & Skiba, 2008). These gaps reflect inadequate academic preparation of students with respect to the acquisition of informatics competency before graduation (Kleib et al., 2022).

Nursing faculty play a prominent role in preparing the next generation of nurses, particularly through integrating digital tools within the educational experience and ensuring that students can take what they learned and later apply it in their clinical practice. However, for faculty members to be able to support student learning about informatics, they must also have the knowledge and skills needed to integrate informatics into curricula (Kowitlawakul et al., 2014) beyond the simple use of instructional technologies. The integration of digital tools and informatics into nursing education has been identified as an important strategy for increasing informatics capacity among future nurses (Brown et al., 2020; Harerimana et al., 2021; Honey et al., 2020; Kleib et al., 2021; Nagle & Clarke, 2004; Nagle et al., 2020a, 2020b). For example, adopting academic electronic health records (EHRs) can help students develop an understanding of the technology and apply informatics skills in a realistic learning context (Borycki et al., 2009; Chung & Cho, 2017; Kleib et al., 2021). Yet when Nagle et al. (2020a) used a survey and focus groups to examine the inclusion of informatics in Canadian nursing undergraduate programs, they found that faculty primarily used digital tools to support teaching and learning and that the integration of informatics in curricula was sporadic (Table 1). Despite the results of this study, research about the use of digital tools within Canadian undergraduate nursing programs remains limited.

**Table 1***Digital Tools Used in Nursing*

Examples of digital tools used in a learning environment	Examples of digital tools used in the clinical environment
<ul style="list-style-type: none"> <li>• Learning management systems (Canvas, Moodle)</li> <li>• Simulation</li> <li>• Social networking applications (Twitter)</li> <li>• E-learning</li> </ul>	<ul style="list-style-type: none"> <li>• Hospital information systems</li> <li>• Monitoring systems (blood glucose monitor)</li> <li>• Virtual health care</li> <li>• Decision supports</li> </ul>

Although very little is known about the informatics capacity of nursing faculty, the COVID-19 pandemic and related restrictions created conditions in which these educators showed the ability to adapt to the digital revolution; however, this change was not without challenges. In nursing education, faculty moved to emergency remote learning (CASN, 2020), which is defined as “a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances. It involves the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has abated” (Hodges et al., 2020, para. 13). Similarly, clinical placements were converted to virtual clinical simulations. This shift was sudden and unplanned. Most faculty were quickly required to develop new skills, challenging them to become competent in the use of digital tools in a very short time, with little deliberate practice and inadequate planning. Other challenges faculty faced included lack of access to digital tools, network issues, and distractions in the home environment (Morgan, 2020). Nevertheless, this shift could be the catalyst that will lead faculty to integrate informatics more systematically into their curriculum. This paper is a subset of data from a larger study exploring nursing faculty experiences in integrating digital tools to support students’ learning in undergraduate nursing programs and in the development of students’ nursing informatics competencies. Because data collection in this study coincided with the COVID-19 pandemic, this paper presents important findings relevant to the challenges posed by the pandemic.

### Methods and Procedures

This study was a focused ethnography with participants recruited from nine undergraduate nursing programs based in Western Canada. Participants were selected using convenience and snowball sampling strategies as it was important to recruit faculty who used and/or did not use digital tools in their teaching practice. A total of 21 faculty members participated in one-hour semi-structured interviews; of these, 12 were interviewed during the pandemic (January to July 2020) and are the focus of this paper. The interview questions and associated probes were guided by the main research question: “What are the experiences of nursing faculty in integrating digital/informatics tools to support undergraduate students’ learning and the development of informatics competencies?” The question was generated from the literature and in consultation with experts in nursing education and nursing informatics (NI). Field notes and a reflexive journal were kept by the first author. Field notes were recorded before, during, and after each interview and were used to record thoughts, differing perspectives, and insights. This allowed the authors to

gain perspective into the phenomenon and provide contextual observations (Knoblauch, 2005). Documents and artifacts are also a source of pertinent data in ethnographic research (Roper & Shapira, 2000), and those reviewed for this study included course syllabi, outlines of learning activities, digital tools used to teach (computer, simulation, etc.) and employed in clinical settings (non-invasive blood pressure monitoring devices, feeding pumps), and the websites of the relevant educational institutions.

Interview recordings were transcribed verbatim by the first author. Data were analyzed using Quirkos. An ethnographic thematic analysis and a constant comparative approach involving a four-step process were used: (1) coding field notes and interviews, (2) sorting to identify patterns, (3) generalizing constructs, and (4) memoing insights and reflection (Roper & Shapira, 2000). Codes were grouped into categories that then led to identifying themes and sub-themes. The analysis was primarily undertaken by the first author and verified by the other authors. Throughout this process, regular meetings and discussions ensured the accuracy and credibility of coding, categories, and theme development.

Trustworthiness was maintained as per the criteria proposed by Lincoln and Guba (1985). Credibility was maintained by adopting reflexivity, data triangulation, member checking, and peer debriefing. The primary author triangulated data from the interviews and field notes, as well as from artifacts, such as the website and an outline of learning activities provided by the participants to either confirm or disclaim the accuracy of the data analysis. Transferability is supported by rich descriptions of the setting and participants, assisting others to evaluate whether study findings are meaningful to other individuals in similar circumstances (Patton, 2015). Furthermore, the findings were supported by participants' quotations to exemplify the related themes. Transferability is further addressed in the limitations. To achieve dependability, Quirkos was used to record decisions made during data analysis and allow for easy retrieval of data. Details of decisions were recorded in a codebook and meeting minutes were kept during regular peer-debriefing sessions. In addition, memos and reflexive journaling added to the auditability of this study. The first author engaged in reflective journaling before, during, and after data collection and analysis. Finally, confirmability is the ability of the researchers to remain objective while engaged in research activities, and this was enhanced through reflexivity.

### **Ethical Considerations**

The study protocol was approved by the Institutional Review Board at the University of Alberta. Participants received an information letter outlining the purpose of the study, the right to withdraw, and the assurance of anonymity and confidentiality. Informed consent was obtained from all participants before conducting interviews.

### **Results**

Twelve faculty were interviewed during the pandemic once their respective institutions had transitioned to remote learning. Participants were female and ranged from 31 to 50+ years of age. Years of teaching experience ranged from 5.5 to 34 years; 10 participants taught in the classroom and two in the clinical setting (Table 2). Four themes are discussed in this paper: the pandemic, enablers, challenges, and learners.

**Table 2***Demographic Characteristics of Interview Participants*

Characteristics	Interview participants ( <i>n</i> = 12)
Gender	
Female	12
Age of participants	
31–35 years	1
36–40 years	0
41–45 years	2
46–50 years	0
>50 years	9
Employment status	
Full time	12
Type of faculty appointment	
Continuing	12
Years of nursing experience	
11–20	6
21–30	2
31–40	4
Years of teaching experience	
1–10	5
11–20	2
21–30	3
31–40	2
Type of teaching	
Classroom only*	8
Classroom and clinical	2
Classroom and laboratory*	1
Clinical only	1

\* Includes face-to-face and online

**Theme: The Pandemic**

The World Health Organization declared the COVID-19 outbreak a global pandemic in March 2020, and most countries including Canada imposed social distancing requirements. Nursing programs had to abruptly shift from face-to-face learning to emergency remote learning to reduce in-person contacts. Faculty quickly reassigned their classes, laboratories, and clinical experiences to meet the learning needs of the now online learner. The 12 participants shared their unique experiences related to integrating digital tools into their teaching practice under the sub-themes of adapting, seeing the benefits, and missing face-to-face interactions.

### ***Adapting***

During the interviews, a resounding attitude noted in participant comments was that of adaptability. The participants embraced the unique challenges they faced as they transitioned to a remote learning environment. Reflecting on participant comments shows they were open, flexible, and adaptable. For instance, as Participant (P) 24 expressed, “You just have to be flexible, adjust to what is happening in the world, and always try to do the best that you can so that students can learn.” Participants reported how they rose to the occasion and were willing to try new digital tools. For example:

We literally had to switch within 72 hours. It was a steep learning curve and some of us really panicked, but I think that generally we've risen to the occasion. I've been forced into it. I don't think I would have been embracing it in this way. (P15)

### ***Seeing the Benefits***

As participants integrated digital tools into their teaching practice and implemented new pedagogical approaches, they noted the benefits of working with these technologies. For example, a participant reported that students were able to participate in a virtual session with experts who shared up-to-date information on current events related to health care:

For my leadership class, I've assigned them to a website. They can access webinars where experts provide information on COVID. It's just better than any textbook, or even reading peer-reviewed papers. They listened for 30 minutes, then the advantage of some of these webinars is that they also had a question-and-answer period. (P20)

Faculty noticed other benefits as well, such as the ability to quickly disseminate information that was constantly changing during the initial stages of the pandemic.

You can do quick updates even in the environment we are in right now. For example, with COVID-19, I get up in the morning, look at it, and put out an update into our LMS [learning management system] that day and the students can access it. (P4)

In addition, participants identified many benefits of remote learning for students, who now accessed courses remotely and did not have to travel to their classes. According to P15, “students are not spending money on travelling nor on childcare, and the same cost on the environment you can do a lot of things from home.”

### ***Missing Face-to-Face Interactions***

It became apparent during the interviews that faculty missed face-to-face interactions with students. They also felt that students were missing out on the sense of community that is typically nurtured during these face-to-face interactions. Participants also expressed some challenges as they as faculty transitioned to remote teaching. They described how it was difficult to gauge students' understanding of the content as they could not rely on nonverbal cues. For example, P20 explained as follows:

The challenge or barrier is you can't see your students. I am big on nonverbal interaction and reading people and getting that vibe... in the classroom we cannot keep check with 100 and plus faces but those who are comfortable, questions often will arise and an arm will shoot up or they will sink into their seat and you can pick up on that so that is a barrier [of digital tools].

Similarly, another participant voiced that she could not sense how students were feeling when discussing a sensitive topic that may have needed to be further explored:

I think you can really kill the joy of learning and you can't get the pulse in the room. I was teaching about suicide risk assessment and dealing with patients with schizophrenia. It can be very triggering for people, and you can't really see them or how they are reacting to the content. When we talk about nursing in palliative care and death and dying, some of these principles are upsetting. I think it's really hard to deliver some of that content electronically. (P15)

Other concerns included privacy and confidentiality for students who did not have a secure place for virtual discussions. P22 explained, "They are at home, they have family members, such as mom or the dad walks in. I always say to them to wear earpieces or headphones so nobody can hear what we are discussing." P15 noted the issue of lack of access:

There are some considerations around students not having access [to online classes], or they just have access on a phone rather than on a laptop. Some of the technologies don't work as well for them, and then finding a quiet space can be tricky if you're talking about sensitive subject matter.

### **Theme: Enablers**

While participants perceived numerous challenges related to integrating digital tools into the curriculum, they also identified success strategies. This theme is characterized by actions that enabled faculty to incorporate digital tools, including support from others and norms and expectations.

#### ***Support from Others***

In addition to support from teaching and learning centres and information technology (IT) support within their academic institution, participants reported that their peers were an important source of support. Participants stated that they shared resources, insights, and practices with one another. For example, P15 disclosed their experience and enthusiasm related to working with and learning from peers during the pandemic, bringing new perspectives on intergenerational collaboration:

I have been lucky enough to be working with three colleagues who are younger. They don't have the same nursing experiences, but their technological ability to use all of the resources was really amazing.

#### ***Norms and Expectations***

This sub-theme includes expectations from others in their workplace and from students. Participants remarked that these expectations pushed them to integrate digital tools into their teaching practice. All participants used the LMS to assist in the delivery of course content, especially during the pandemic. P10 explained that "in this day and age, you can't teach without it!" P8 expressed how working with digital tools has become the norm:

I guess it depends on your generation. Computers weren't even around when I did my first diploma program. When I did my bachelor's degree, I had to learn to work with computers because they were an expected part of learning. I imagine new technologies are always going to be coming. We need to be comfortable with them, then adopt them and learn how to use them.

As faculty return to teaching face-to-face in the classroom, they should continue to be encouraged to work with digital tools.

### **Theme: Challenges**

The challenges theme includes barriers or sources of concern related to integrating digital tools into faculty teaching practice, and included sub-themes related to the steep learning curve and the effects of technology.

#### ***Steep Learning Curve***

Participants reported that the steep learning curve was an important challenge to integrating digital tools into their teaching practice. Many participants expressed that they quickly transitioned from delivering educational content face-to-face to remote learning within days. The participants' academic institutions offered faculty sessions on how to transition to remote teaching, but these learning sessions were considered “too fast” or “too complex” or as delivering “too much information over too short a period.” P16 recounted:

I did attend [faculty development] but the challenge for somebody like me, who is still a neophyte, is that it was done too quickly. I did not retain a lot even though I took notes. What concerns me, as somebody who doesn't come to it naturally, is that the same educational principles we would use for any other field of learning endeavour don't seem to apply to computer technology.

P5 expressed wanting to learn how to use digital tools in a way to help students but that learning how to use it was a challenge: “Although I use a lot of technology, I can't say that I'm savvy... Knowing how to use it! That's a learning curve... and how you can use it and integrate it in a way that is useful for students.” Some participants described how digital tools are always changing and that it was difficult to find time to become more familiar with the tools. P26 highlighted that “familiarity is a challenge. I only have so much time in the day. I can't keep up.”

#### ***Effects of Technology***

During the interviews, faculty were concerned about the effects of technology on students' abilities to develop relationships with their patients in the clinical environment: “My biggest concern with technology is that it takes away from true face-to-face communication with people. They [students] don't know how to talk to each other” (P10). For another participant, the impact of technology on the nurse-patient relationship was also a concern:

It is a worry for me. I think sometimes it supersedes [technology], the nurse-patient relationship. I find students caught up in what is online, and they spend hours and hours researching their patient, and I tell them to look at the patient that is sitting there. Speak to them. Talk to them. Assess them. You can look all this up later. (P15)

Some participants expressed that students need to go back to basic nursing care. They referred to that as learning “good old-fashioned nursing care” or “striking a balance” between using digital tools and spending time with patients/clients. P10 firmly stated:

They need to get past the technology. Things don't always turn out the way they should. They need to be able to adapt on the fly, and sometimes that's not technology. Sometimes that's just good old-fashioned human caring. It's great that they have all this technology, but it's not the end all and be all, and that's the piece that's hard to teach to the young students.

Others questioned whether the constant exposure to and use of digital tools at home and in academic settings can have a negative effect on students. According to one participant, “people seldom turn off their phones... I think that's unhealthy.” Another participant described this even more profoundly as “the risk of addiction and never turning it off,” expressing concerns about “how students moderate [the] information explosion” (P10).

### **Theme: Learners**

Participants also noted that the characteristics of learners were important. Participants noted wide differences in skill sets among students. For example, the younger generation was more likely to be more familiar, comfortable, and competent with using digital tools, and described them as “tech savvy” or “computer savvy.” Another noted that “sometimes our mature students take a little bit more time using them, like me. It is not as intuitive, or they don't have as much experience with it. Our younger students are really comfortable and confident [with digital tools]” (P16). Some participants, however, perceived the younger students as familiar with the use of these tools for social application to maintain connections with others but unaware of how to use digital applications for learning and nursing practice. For example, P17 explained, “What I have noticed about students, they are digital natives if you are referring to their use of phones and their social media. They have not learned how to use a learning management system.” Another participant shared the following thoughts:

We sometimes assume students come in with a large digital knowledge. They are savvy from a social perspective. As faculty, we have a responsibility to help them understand nursing informatics, eHealth, and how to best present themselves professionally. (P13)

### **Discussion**

The purpose of this focused ethnographic study was to explore nursing faculty experiences related to their use of digital tools to support student learning in undergraduate programs during the challenging circumstances that accompanied the COVID-19 pandemic. During this time, nursing programs transitioned from face-to-face to emergency remote teaching, significantly impacting how nursing faculty engaged with digital tools. Often, faculty had no prior preparation, and rethinking how they were going to deliver pedagogical content through online tools at full scale required them to be innovative, flexible, resilient, and responsive (Morin, 2020). Findings from this study offer a unique historical perspective on how faculty integrated digital tools into their teaching practice.

Drawing on their experiences, participants remarked about having opportunities to experiment with digital tools and collaborate with other faculty members teaching under similar circumstances. This perhaps helped foster a culture that was supportive and accepting of faculty who had varying levels of technological proficiency but also were confronted with gaps to overcome and the need to draw upon resources within their reach, for example, younger nurse educators who were more comfortable using technology. This was further normalized by the fact that the response to the pandemic demanded an acceleration in the adoption of digital tools by faculty who otherwise would not have felt an urgency to address gaps in their capacity to use technology or to develop their informatics competence before the pandemic. As it became the norm for faculty to incorporate digital tools into their teaching practice, they noted the benefits of using these tools not only for them but also for students. Building on this momentum and continuing to support faculty's purposeful integration of digital tools into the nursing curricula is important (Booth et al., 2021; Seah et al., 2021) to strengthen faculty capacity in the use of digital

tools as key strategies to increase nursing student informatics competencies (Borycki et al., 2013; Brown et al., 2020; Harerimana et al., 2021; Honey et al., 2020; Kinnunen et al., 2017; Nagle et al., 2020a; NLN, 2015). Faculty engagement and professional development are critical components for the successful implementation of curricular changes.

Participants in this study also discussed challenges related to the use of digital tools. The steep learning curve in understanding how to use digital tools was a significant challenge even before the pandemic, requiring faculty to invest time and have many opportunities to practice with technology. The literature reports that faculty have limited time to learn about new digital tools (Canadian Digital Learning Research Association [CDLRA], 2020; Kowitlawakul et al., 2014; Oermann, 2015; Ramlo, 2021; Webb et al., 2017) and have heavy workloads (which increased during the pandemic; Sacco & Kelly, 2021), further limiting their availability to engage with digital tools (Bittner & Bechtel, 2017).

When engaging with students online during the pandemic, faculty expressed concerns regarding the lack of immediate feedback from students and their inability to observe students' nonverbal cues. Faculty believed an important component in the learning experience was for them to get a sense of students' understanding of the content or how students felt when discussing a sensitive topic. Participants also missed the interpersonal aspect associated with teaching face-to-face, which is congruent with findings from prior research (Jeon et al., 2021; Ramlo, 2021). Faculty had concerns related to building connections and rapport with students in an online environment. The face-to-face interactions faculty have with students in the classroom, laboratory, and clinical setting could be considered part of their subculture as faculty frequently develop rapport with students based on a caring perspective (Christopher et al., 2020); hence, participants in this study may have had difficulty showing a caring presence in an online environment.

This study also highlighted faculty concerns related to the ability of students to develop caring, empathetic, and compassionate attitudes in the presence of digital tools. Faculty perceived these tools as a threat to these fundamental nursing values; similar concerns have been reported in the literature (Locsin & Purnell, 2015). Such concerns have recently been discussed in emerging literature relative to the expansive use of information and communication technologies, specifically with the advent of artificial intelligence; however, further research is needed in this regard (Registered Nurses' Association of Ontario & Associated Medical Services, 2020). While these are significant concerns, caring can be learned by providing students with purposeful practice, emphasizing the intention of caring in their interaction with others (Nadelson et al., 2016). Faculty can role-model the interplay of the nurse-client relationship in the presence of digital tools and could cultivate a sense of caring in students within a technologically rich health care environment (Buchanan et al., 2021).

Other challenges raised by participants and related to technological constraints, such as lack of access, are also noted in the literature (Haslam, 2021). Faculty members must consider the lack of privacy for open discussion while students are in a non-academic environment. Other valid concerns during the pandemic noted in the literature include lack of access to Wi-Fi, adequate bandwidth, or digital technologies, as well as the presence of distractions (Morgan, 2020), all of which must be considered to mitigate disruptions in learning. Finally, the participants recognized that the generational diversity existing among nursing students affects how individual students interact with digital tools. Although some students may embrace digital tools for personal use, they may not be aware of how to use these tools in the professional setting. Significant knowledge gaps have been noted when students require access to digital information through literature databases

and resources in the educational environment. Gaps were also noted in students' ability to access information through clinical information systems, which is needed for effective clinical decision-making for patient care (Bond & Procter, 2009; Borycki et al., 2013; Fetter, 2008). Students also often tend to overestimate their computer competence (Elder & Koehn, 2009) and, accordingly, should not be assumed to have the skills required to learn in a digital learning environment (CDLRA, 2020). Furthermore, students must advance their technological skills beyond computer literacy to have a better understanding of NI as a core competency, as well as developing a greater understanding of digital health and virtual care as new models of care delivery (Kleib et al., 2022). The response to the pandemic, although reactive, created unique conditions that contributed to increasing faculty use of digital tools with many great successes that further underscore the importance of NI (Atique et al., 2020; Booth et al., 2021). Yet faculty need continued support to further expand on those successes and take a more proactive role in advancing their NI capacity, and consequently that of their students.

### **Recommendations**

Considering the ongoing digitalization of health care and findings from this study, continuing education in informatics and digital health is a priority area for faculty professional development. These opportunities can assist faculty members in further expanding their own informatics competencies and knowledge about the broad spectrum of digital health technologies and services, such as telehealth, mHealth, and virtual health. To initiate this process, faculty members may begin by conducting a self-assessment of their level of informatics competency using resources such as the Canadian Nurse Informatics Competency Assessment Scale (Kleib & Nagle, 2018). Building on successes accomplished to date, faculty members are also encouraged to continue to be engaged in professional development by establishing a local informatics community of practice to sustain a culture of learning and innovation. Faculty could connect with local peer groups to share information and ideas while encouraging the integration of informatics. Participants identified learning with peers as a facilitator in their use of digital tools. Collaboration with other faculty may help empower these nurse educators to integrate digital tools into their teaching practice while providing support to other faculty members. In addition, nursing faculty could connect with peers through the CASN digital health interest group in which members can share information and exchange ideas about current trends. Academic leaders are encouraged to facilitate faculty professional development in digital health and informatics, such as by allocating faculty time to attend conferences and/or providing resources such as academic EHRs to enable faculty to convey this knowledge to their students.

At this critical juncture of increased use of technology in health care and education, it is paramount that students and faculty have not only informatics competency but also a comprehensive understanding of digitalization trends in health care and higher education. Currently, Canadian institutions that teach nursing undergraduate courses have an expectation that students entering their programs possess basic computer skills (CASN, 2012); however, this study and anecdotal evidence during the pandemic have brought to light challenges related to digital literacy skills and access to technology and Internet services. Considering concerns identified in this study in relation to students having varying levels of comfort and experiences with digital technologies, nursing programs may consider a baseline assessment of students' digital literacy skills upon admission into the program. Students requiring more support could be advised to complete the International Computer Driving Licence, an internationally recognized computer literacy certificate, to build these skills (De Gagne et al., 2012). Finally, faculty members will have

an important role in assisting students in making connections between the application of technology in a learning environment and the use of technology for care provision.

Despite positive gains accomplished by digital care during the pandemic, there needs to be more research to identify gaps and challenges relevant to quality of care, as well as the impact on care providers. It is also suggested that the expanded use of virtual care will require newer models of clinical education to ensure nursing students understand how to provide nursing care in these new environments.

### **Limitations**

The findings of this study are limited to a particular period in time, as the experiences of the 12 faculty members interviewed reflect the unique circumstances related to the onset of the COVID-19 pandemic. These participants were forced to become more reliant on digital tools, which may have influenced their perceptions; hence, the findings reported should be interpreted with caution. Furthermore, although the intent of the study was to conduct more face-to-face interviews and site visits, the pandemic precluded these activities. Another limitation pertains to demographics of study participants, as all were female, and many were over the age of 50.

### **Conclusion**

Although the transition to virtual delivery of course content during the COVID-19 pandemic was challenging, it created unique conditions that contributed to the increased use of digital tools by faculty in undergraduate nursing programs. The pandemic was a catalyst that forced faculty to interact with digital tools as they became essential to the delivery of pedagogical content. This study highlighted faculty experiences and perspectives related to the many challenges they faced as they integrated digital tools into nursing education. This study also underscored how technology is transforming the nurse educator role. Accordingly, there is an urgent need to strengthen NI capacity in this group. It is vital for policymakers and academic leadership across undergraduate nursing programs to implement strategies in a more systematic way to mitigate challenges and foster nursing faculty capacity in informatics. This, in turn, will serve to arm the future workforce with the digital capabilities needed in the workplace.

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