



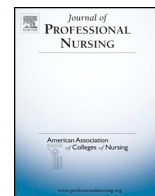
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Transitioning from direct care to virtual clinical experiences during the COVID-19 pandemic^{☆,☆☆}

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ABSTRACT

When the COVID-19 pandemic forced university campuses and healthcare agencies to temporarily suspend both undergraduate and graduate direct care educational experiences, nursing programs had to formulate alternative plans to facilitate clinical learning. Texas Woman's University used this opportunity to assemble a faculty group tasked with creating a set of college-wide guidelines for virtual simulation use as a substitution for traditional face-to-face clinical. The process included completing a needs assessment of both undergraduate and graduate level programs across three campuses and identifying regulatory requirements and limitations for clinical experiences. The task force utilized the information gathered to develop evidence-based recommendations for simulation hour equivalence ratios and compiled a list of virtual activities and products faculty could use to complete clinical experiences. Undergraduate and graduate student surveys were conducted to determine the effectiveness of the transition to virtual clinical experiences. Overall, the majority of survey results were positive regarding virtual simulation experiences providing students with valuable opportunities to enhance their learning. Negative comments regarding the impact of COVID-19 on a personal level included issues involving internet access and web conferencing logistics, lack of motivation to study, family difficulties, and faculty in-experience teaching in an online environment. Undergraduate pre-licensure students were provided with opportunities to successfully complete all remaining required clinical hours virtually, while graduate students were allowed to complete non-direct care hours as applicable using virtual clinical experiences.

Introduction

Texas Woman's University migrated to online didactic and clinical delivery midway through the Spring 2020 semester secondary to restrictions and recommendations related to the Coronavirus Disease 2019 (COVID-19) pandemic. Within the university system, the college of nursing (CON) has three campuses with one located on the main university campus in Denton and two satellite centers located in Dallas and Houston. Approximate CON enrollment across all campuses for Spring 2020 included 2000 undergraduate and graduate students.

The main center restricted campus access for everyone with the exception of those deemed as essential employees. The two satellite centers which primarily house nursing and health professions programs were closed. In addition, many clinical partners across the state

temporarily suspended both undergraduate and graduate direct care clinical experiences or restricted student and faculty access to clinical agencies where direct patient care was being delivered.

The purpose of this project was to assemble a faculty-led task force to develop a set of recommendations for the CON regarding virtual simulation (VS) use in response to COVID-19 clinical site closures. CON leadership tasked the group with outlining the scope of the problem and making evidence-based recommendations for the implementation and evaluation of a plan to transition students from traditional direct care clinical settings to virtual clinical learning experiences. The transition covered the entirety of the undergraduate pre-licensure program and the advanced practice nursing (APRN) and nurse educator (NE) tracks of the graduate program within the scope of the state board of nursing and advanced practice regulations.

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Theoretical framework guiding the project

A theoretical framework was defined to support the VS efforts by the faculty members. This effort was guided by some of the key frameworks and associated standards in the simulation industry (INACSL Standards Committee, 2016a, 2016b, 2016c, 2016d). For example, the clinical simulation practise (CSP) framework specifically addresses changes in the patient population, professional regulations and clinical environments (Khalili, 2015), while others, such as the Society for Simulation in Healthcare (SSH), focus broadly on four main purposes: education, assessment, research, and health system integration in facilitating patient safety (INACSL & SSH, 2020). Each of these purposes may be met by some combination of role play, low and high tech tools, and a variety of settings from tabletop sessions to a realistic full mission environment.

During the pandemic situation, however, where rapid transition from face-to-face teaching to simulated teaching in a virtual environment was necessary, the project team determined a guiding framework of specific actions and outcomes was needed. After review of several options, the team concluded the Jeffries Simulation Framework offered the most practical representation (Jeffries et al., 2015). The concepts reflected in the Jeffries Simulation Framework helped organize the rapid transition of teaching content and equipment needed to avoid gaps in learning when the clinical site experiences were terminated to manage the coronavirus pandemic outbreak. The specific framework concepts that provided simulation-development guidance, in order of impact were: 1) learner centered, 2) trusting, 3) collaborative, and 4) interactive (Cowperthwait, 2020; Jeffries et al., 2015). The overall Jeffries Simulation Framework was used throughout the simulation development process and these four concepts were consistently impactful foci.

Literature review

The abrupt academic challenges brought on by the COVID-19 pandemic will have everlasting changes on the nursing educational landscape (Dewart et al., 2020). Nurse educators were turning to the use of simulation activities to replace clinical experiences as hospital sites were closing. The International Nursing Association of Clinical Simulation and Learning (INACSL) Standards Committee (2016d) defined simulation as “an educational strategy in which a particular set of conditions are created or replicated to resemble authentic situations that are possible in real life. Simulation can incorporate one or more modalities to promote, improve, or validate a participant’s performance” (p.544). Simulation-based learning strategies have been shown to be an effective method for teaching higher level competencies, such as collaboration, decision-making, prioritization, effective communication, safety, and clinical judgment skills (Kubin et al., 2020; Lee et al., 2019). One type of simulation is VS. Lioce et al. (2020) described VS as a computer-based recreation of reality placing the user in an autonomous role controlling the environment. The user can exercise motor control, decision making, and communication skills.

The Institute of Medicine (2011) discussed the crucial role technologies and online education will play in the future of nursing, both in undergraduate and advanced degrees. The use of VS was supported as a viable solution for clinical experiences during the pandemic (Society for Simulation in Healthcare [SSH] & INACSL, 2020). Evidence from researchers has repeatedly demonstrated VS as an effective pedagogical strategy in nursing education (Foronda et al., 2018; Foronda et al., 2020; Gu et al., 2017; Padilha et al., 2018; Padilha et al., 2019; Sapiano et al., 2018; Tantillo and Christopher, 2020; Verkuyl and Hughes, 2019; Wright et al., 2018). VS is an evidence-based approach in which nursing students are placed within a safe and controlled learning environment, allowing them to experience and learn from the results of their decision-making and actions (Foronda et al., 2018; Liebold and Shwarz, 2017; Verkuyl and Hughes, 2019).

The Virtual Simulation Task Force recommended faculty follow

simulation best practices as outlined by INACSL (2016a, 2016b, 2016c, 2016d) when designing and/or facilitating VS learning experiences was supported by researchers in the literature. Tantillo and Christopher (2020) asserted faculty should prioritize student needs when selecting and designing experiences, and they offered best practices for a variety of learning tools and web-based learning strategies. Mendez et al. (2020) emphasized the importance of following standardized concepts when adopting and implementing virtual technologies.

Virtual simulation use in undergraduate education

For pre-licensure baccalaureate programs, the National Council for State Boards of Nursing (NCSBN) (2016) recommends nursing programs utilizing simulation as a clinical substitute for traditional clinical experiences, not exceed 50% of its clinical hours. However, a state waiver was granted permitting students in their final year of a nursing education program to meet clinical learning objectives by exceeding the 50% limit on simulated clinical learning experiences (Texas Board of Nursing, 2020a).

Virtual simulation use in graduate education

Graduate students in an APRN program must complete a clinical practicum or preceptorship within their program, allowing them the opportunity to provide direct advanced practice patient care and management under the guidance/supervision of faculty and qualified clinical preceptors (Texas Board of Nursing, 2013). For graduate APRN programs, the state waiver increasing the limit of simulated clinical learning experiences only applied to course-related clinical hours in excess of the minimum standard direct care hours (500 h) required by the Texas Board of Nursing.

The utilization of simulation and web-based programs, such as VS, for advanced practice education has been supported in the literature (Kang and Kim, 2020; LeFlore and Thomas, 2016; Tantillo and Christopher, 2020). Foronda et al. (2014) evaluated Master’s level nurse educator students’ experiences after using VS in their online program. The results they reported were consistent with the Jeffries (2005) Simulation Framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. Kelley (2014) incorporated the use of virtual patients into an advanced assessment course with The Digital Clinical Experience™ (DCE) simulation software developed by Shadow Health™. The program was designed to advance the skills of critical thinking and comprehension through experiential practice, reflection, and questioning (Kelley, 2014). The faculty were able to evaluate essential advanced assessment skills through structured student practice (Kelley, 2014).

Simulation hour equivalence ratio

The state board of nursing does not define an equivalence ratio between simulation and clinical hours for undergraduate or graduate nursing programs, however, the board cites the 2017 NCSBN national simulation study which reported almost 80% of programs responding used a 1:1 ratio of clinical to simulation hours (Bradley et al., 2019; Texas Board of Nursing, 2020b). However, more recent evidence supported the use of a higher ratio of 2 clinical hours to 1 hour simulation when used for substitution of traditional clinical experiences (Jimenez, 2017; Sullivan et al., 2019). Evidence to support the 2:1 clinical to simulation hour ratio has been validated through the completion of activities demonstrating higher levels of clinical competence in significantly less time than traditional face-to-face clinical experiences (Jimenez, 2017; Sullivan et al., 2019). This is due to the robust, compressed nature of simulation which enhances clinical reasoning by guiding students through purposeful, guaranteed learning experiences.

Table 1
Virtual simulation product recommendations.

Virtual product	Vendor(s)	CON program(s)	Sample course(s)	License(s)
Shadow Health Digital Clinical Experience (DCE)	Shadow Health	Graduate, Undergraduate	Mental Health (undergraduate) Advanced Health Assessment (graduate)	Individual Student
<ul style="list-style-type: none"> ● Health Assessment ● Advanced Health Assessment ● Pharmacology ● Advanced Pharmacology ● Mental Health ● Gerontology ● Leadership 				
NurseThink vClinical	Nurse Tim	Undergraduate	Critical Competency Integrations (capstone)	Individual Student
vSim for Nursing	Lippincott/Wolters Kluwer/Laerdal	Undergraduate	Child Health Concepts/Fundamentals Health Assessment Women's Health Adult Health I Adult Health II	Individual Student
<ul style="list-style-type: none"> ● Health Assessment ● Gerontology ● Pharmacology ● Fundamentals ● Medical Surgical ● Pediatric ● Maternity ● Pediatric and Maternity 				
Lippincott Clinical Experiences: Community, Public, and Population Health	Lippincott/Wolters Kluwer	Undergraduate	Community Health	Individual Student
DocuCare EHR	Wolters Kluwer/Lippincott	Undergraduate	Varies across courses	Individual Student
Aquifer Pediatrics Virtual Patient Cases	Aquifer	Graduate	PNP APRN	Individual Student or Institutional License

Methodology

A VS task force was created and composed of faculty experienced in simulation with undergraduate and graduate faculty representation from all three campuses. Simulation lab administrator representation was also included. Due to the time-sensitive nature of the immediate crisis, members were asked to meet frequently via a virtual platform. As the focus of the project was transitioning clinical curriculum delivery from in-person to online modalities as part of normal educational practices, IRB approval was not indicated. Task force members met virtually with CON administration, undergraduate, and graduate faculty to conduct a needs assessment of all applicable CON programs. The assessment included undergraduate pre-licensure and masters-level APRN and NE graduate programs across the three campuses. Undergraduate course managers and graduate track leaders were asked to outline current needs based upon the average number of clinical hours individual students had completed through mid-semester. Data was compiled into a shared spreadsheet for task force review and analysis. These hours included direct care, lab, and simulation activities. Some programs and courses were already utilizing VS products as a component of the planned didactic and clinical learning experiences for the semester requiring considerations as to availability of additional virtual products on top of existing usage.

Faculty were asked if there was an existing plan in place to complete student clinical experiences in a virtual environment and to outline the plan for the task force. Benefits and limitations of VS products were discussed. For courses with > 50% of students enrolled needing > 24 h to meet course requirements, a VS product was recommended for use in replacement for direct care clinical experiences.

For courses in which the majority of students needed < 24 h to meet course requirements, faculty were given the option of selecting a VS product for use or other supplemental educational products (ex. free VSs, interactive unfolding case studies). Faculty were asked to outline plans for virtual clinical learning experiences if choosing not to use a VS product. Plans proposing the integration of both VS products and supplemental virtual clinical learning experiences in place of direct care clinical experiences were outlined for both the undergraduate and graduate programs.

Recommendations

The Virtual Simulation Task Force recommended the transition from all traditional face-to-face clinical learning experiences to virtual learning modalities as allowed by program accrediting bodies. VS activities may replace traditional direct care clinical learning experiences and/or lab hours as outlined in program requirements. The task force recommended VS examples to include:

- Undergraduate Program: commercial VS products; low, medium, or high-fidelity simulation delivered virtually; faculty-facilitated unfolding case studies; faculty-guided clinical reasoning learning experiences; simulated telehealth scenarios
- Graduate Program: commercial VS products; objective structured clinical examinations (OSCE) facilitated virtually; faculty-guided interactive case studies with synchronous consultation; simulated telehealth scenarios

The task force recommendations regarding the amount of hours allowed for simulated clinical learning activities for both undergraduate and graduate programs followed the guidelines according to the state board of nursing and APRN specialty organizations for certification. In the APRN programs, if additional clinical hours are required by the institution or certifying body (above the minimum 500 supervised direct patient care clinical hours), these additional hours may be completed as simulation ([National Organization of Nurse Practitioner Faculties, 2020](#)).

The task force recommended an institutional purchase of several commercial virtual learning products to be used in the facilitation of undergraduate and graduate clinical learning experiences based upon identified survey needs as outlined in [Table 1](#). The institutional purchase helped to reduce the financial impact upon enrolled students who were already experiencing pandemic-related hardship. Products were reviewed and selected by the task force based upon ability to meet course-specific student clinical learning objectives in developing clinical judgment, clinical reasoning, prioritization, and delegation skills. Logistical considerations in product selection included ease of use and facilitation, faculty familiarity with products, and cost of products.

Table 2
Virtual educational resource repository.

Virtual resource	Vendor(s)	CON program(s)	Link
NLN Advancing Care Excellence for Seniors (ACE.S) Case Studies: Unfolding Cases	NLN	Undergraduate	http://www.nln.org/professional-development-programs/teaching-resources/ace-s
COVID-19 and Sepsis Unfolding Cases	KeithRN	Undergraduate	https://keithrn.s3.us-east-2.amazonaws.com/Misc/STUDENT-COVID-19_UNFOLDING_Reasoning.pdf?goal=0_528446d564-8b456ea833-3283280838&mc_cid=8b456ea833&mc_eid=d0f52ce70b
Exploring a Virtual COVID-19 case	iHuman/Kaplan	Undergraduate, Graduate	https://shop.kaptest.com/i/covidcase
Computer-based scenarios focused on care of the elderly	Center for Geriatric Clinical Simulation at UNC-Chapel Hill	Undergraduate	http://geroclinsim.org/
Nursing Simulation Scenario Library	Montgomery College	Undergraduate	https://www.montgomerycollege.edu/academics/departments/nursing-tps/nursing-simulation-scenario-library.html
Preceptor Development Program	NYU Preceptor Program	Graduate, APN	https://pdpp.nursing.nyu.edu/education
Virtual Hospital	Centennial College, Ryerson University, and George Brown College	Undergraduate	https://de.ryerson.ca/games/nursing/hospital/map.html?fbclid=IwAR0gyWzPmCINKF-46DtL8HYoL6ZXLabvL072MWLYiQyMa38BdbOmqVZac
Telehealth Remote Patient Monitoring (RPM) Hub for Nursing	Care Innovations, LLC	Graduate, Undergraduate	Partnership with local telemedicine provider
Distance Learning	F. A. Davis	Undergraduate	Faculty access to clinical simulations for the nurse educator, interactive clinical scenarios, skills videos, and instructor case studies.
Access Medicine Case Studies	McGraw-Hill Medical	Graduate	University library subscription available for use by college of nursing.
Pediatric Prioritization Simulations	Texas Woman's University	Undergraduate	Interactive pediatric prioritization simulation scenarios on google sites for blended individual/small group learning experience.
Virtual OSCE	Texas Woman's University	Graduate	Adult and Pediatric APRN OSCE scenarios with standardized patients via Zoom platform.
Postpartum Virtual Escape Box	Texas Woman's University	Undergraduate	Interactive, unfolding women's health postpartum case scenario.

Many vendors, in order to help during the pandemic, offered products on a trial basis or at a reduced rate for the remainder of the semester.

For courses in which there was an identified virtual product need, an individual license was obtained for each student for the selected product. For example, the task force recommended purchasing an individual student license for each student enrolled in the undergraduate senior practicum course for a product that allowed students to take care of up to four virtual patients at a time. This was consistent with the clinical objectives of the course and emphasis was on prioritizing care, delegation and assignment, and medication administration. These students were assigned a bundled set of cases to complete after which they would schedule a virtual hand-off with faculty after the assignment had been completed using the situation, background, assessment and recommendation (SBAR) method. Faculty then gave feedback on student performance with suggestions for improvement.

The undergraduate mental health course was already utilizing a VS product for 50% of the senior-level students' clinical hours. However, when several community partners were unable to host student clinical experiences due to the pandemic, twenty students who had not yet entered the direct care setting were left without a clinical placement for the semester. While most students enrolled in the course had completed the majority of required clinical hours, these students needed additional virtual clinical opportunities to complete the remaining clinical hours and demonstrate mastery of clinical objectives. Twenty individual product licenses were purchased for these students while the remaining students completed faculty-facilitated virtual clinical experiences in small groups using supplemental resources.

Students in the graduate nurse educator program needed virtual opportunities to assist with development and facilitation of student didactic & clinical learning activities. The program track leader, course instructor, preceptors, and undergraduate course managers worked with the students to coordinate clinical learning experiences. The NE students were able to obtain practicum hours by participating with faculty in the development, implementation, & management of the course and clinical experiences during the transition to online and virtual clinical.

Implementation guidelines

All faculty designing or facilitating VS learning experiences were directed to follow current simulation best practices. The task force chose to use the guidelines outlined by INACSL. The INACSL Standards of Best Practice provided faculty guidance in simulation design, outcomes and objectives, and facilitation (INACSL Standards Committee, 2016a, 2016b, 2016c, 2016d). Per the American Association of Colleges of Nursing (AACN) (2020) recommendations, faculty were also encouraged to reinforce infection control content and include new information as it related to COVID-19. When faculty used products without an electronic health record, or built in documentation components, it was recommended faculty develop documentation for students to complete and submit.

The task force recommended the use of an equivalence ratio of 2:1 between VS and clinical hours for all hours spent completing VS cases and associated assignments for both undergraduate and graduate programs. For virtual labs and self-study cases that did not provide the same robust learning experience as faculty-facilitated virtual experiences, a 1:1 ratio was recommended. When provided by the vendor, the estimated student completion time was used to initially calculate simulation time using a virtual learning product. The equivalence ratio of 2:1 clinical to simulation hour ratio was then applied to calculate the total number of clinical hours spent in the virtual learning environment. When faculty-designed VS experiences were used, the actual time spent in the virtual simulated learning environment was used to define the simulation time. Faculty then used this calculated simulation time and applied the 2:1 clinical to simulation hour ratio to the faculty-designed experience.

Faculty resources

Using VS as a teaching approach required consideration of additional faculty needs and resources. The task force designated faculty mentors willing to serve as resources for recommended virtual learning products. These volunteer mentors were selected based upon having previous experience working with one or more of the virtual products. All faculty using a virtual learning product had to attend an on-demand training session, webinar, or demonstration. Product-specific training sessions were provided by vendor representatives, web-based vendor resources, and volunteer faculty mentors. Faculty also communicated with designated faculty mentor(s) or vendor representative(s) if further questions arose on how to access or utilize the product. A repository was created that contained an evolving list of potential resources including technical software product guides, best practices for VS, and free virtual educational tools and products for clinical hour supplementation (Table 2).

Evaluation

Faculty planning VS learning experiences considered the methodology to be used for evaluation of student performance appropriate to course-specific simulation objectives and in alignment with the program's clinical evaluation tool (ex. research-validated rubrics, faculty-designed rubrics specific to experience objectives). For VS products, minimum standard student achievement scores were assigned to be used as evidence of concept mastery. For faculty who used supplemental resources or virtual products in small groups versus individual student assignments, rubrics were employed to rate student performance in simulation. Appropriate evidence-based rubrics were recommended by the task force based upon course-specific learning experience objectives and outcomes. Rubrics were selected based upon demonstrated reliability and validity in the evaluation of simulation experiences and for which faculty mentors had previous experience with use. Examples of rubrics provided as examples for faculty use included the Creighton Competency Evaluation Instrument, the Lasater Clinical Judgment Rubric, and the Seattle University Evaluation Tool (Hayden et al., 2014; Lasater, 2011; Mikasa et al., 2013).

Faculty kept a record of all VS and clinical learning experiences. Documentation of undergraduate clinical hours was entered into a shared program spreadsheet while graduate student clinical hours were entered into a clinical calendar tracking system. All documentation included the individual student name(s), name of the activity, number of hours completed, and any additional documentation related to assignment as applicable. Undergraduate course managers and graduate track leaders were asked to keep documentation regarding activity objectives, description of methodologies, and outcomes evaluation methods for accreditation review purposes.

Results

Undergraduate and graduate student surveys were conducted at the end of the semester using a 5-point Likert Scale to determine the effectiveness of the transition from traditional clinical to virtual clinical experiences.

Undergraduate outcomes and evaluation results

All undergraduate pre-licensure students were provided with opportunities to successfully complete all remaining required clinical hours using VS experiences. Fifty-three percent of undergraduate students responding to end-of-semester evaluations agreed or strongly agreed VS experiences provided valuable opportunities to enhance their learning. Twenty-one percent of undergraduate students were neutral, and 12% responded negative. Fourteen percent selected not applicable, which may account for students enrolled in courses without a clinical

component.

In the open-ended responses commenting on the impact of COVID-19 on a personal level, students verbalized difficulties with internet connections and issues with web conferencing, lack of motivation to study, family difficulties (i.e. children at home, living with parents, becoming sick with COVID-19, financial issues), and inexperience of faculty with an online environment. Concerns were expressed regarding virtual assignment guidelines, decreased “hands on” experiences, and the potential impact on future learning and employment opportunities. Some students' comments in regard to these difficulties were:

- “I think that much more flexibility with clinical hours should have happened when we went online. XXX is not an appropriate simulation to spend dozens of hours in.”
- “It kept me from rounding on the most important units in women's health. At the beginning of the course, I had a genuine interest in pursuing a career in the field, but without seeing what labor and delivery was like and what the NICU entailed, I am not sure if I will ever get those experiences and like them enough to choose the field as my career.”
- “The bundles for clinical credits also required too much time. They should have counted as 6 hours each (12-hour shift using 2:1 ratio) instead of only 4 hours a piece. The bundles were also unhelpful in learning what we need to know as nurses. Of course, nothing can ever truly replace an in-person clinical, but XXX bundles certainly do not come close.”

However, the majority of students responded with positive comments including appreciation for quickly developing a transition plan to virtual learning as a replacement for cancelled clinical experiences, helping to ensure program progression and on-time graduation. Some students stated the following:

- “The virtual simulations were very helpful.”
- “The virtual simulations ended up helping me with the units like OB and Pedi that I don't have much experience in.”
- “The virtual simulations to complete our clinical requirements were useful in practicing applications of community health concepts.”
- “After two priority sims, I have learned a lot!!!! I find myself much more confident ‘who to see first’ because I can analyze patient data now.”

Graduate outcomes and evaluation results

All graduate APRN and NE students were provided with the opportunity to complete clinical hours using virtual clinical experiences in excess of the minimum direct care hours required by the state licensing board and advanced practice regulatory organizations. Graduate APRN students were also given the option to return to direct patient care clinical settings to complete remaining clinical hours once deemed safe to do so by the CON and clinical partners. Students who were unable to complete minimum required direct care hours, or those considered to be part of a high-risk population, were able to choose between several options including non-punitive late withdrawal and receipt of a grade of incomplete for the semester. The NE track students successfully met all clinical practicum requirements for the semester. The APRN track students enrolled in a single practicum course were able to complete the direct care hours required to satisfy program requirements for the semester. However, a percentage of students enrolled concurrently in more than one practicum course were unable to satisfy semester requirements for both practicums and will have to obtain additional hours prior to program completion. A limited number of students had to postpone graduation and complete clinical hours in direct care or telemedicine during the summer session to meet graduation requirements.

Graduate student evaluations of the virtual learning experience

were overall positive and expressed appreciation for an alternative being offered after the face to face clinical site experiences were closed to students. This allowed most students to complete all their required semester hours. Case studies were viewed as positive and preferred by some students over telemedicine. One student commented the nurse educator-led conference calls allowed for the ability to truly delve deep into the topic. Students appreciated the autonomy and fluidity of the virtual online offerings. Negative student comments in the evaluation included feelings they were missing learning opportunities by not being in a face-to-face clinical practice, and the experience of an increased level of stress related to faculty grading of student performance during virtual learning experiences.

Student comments also included statements on the general stress of the pandemic resulting in children being home, homeschooling and increased workloads since most graduate students worked in the medical field and had to contend with the risk of contracting COVID-19. Students reported they were already experiencing a high level of stress prior to the pandemic which was compounded with academic and personal life changes during the pandemic.

Limitations and implications

The pandemic has taught nurse educators to think outside the traditional box while continuing to provide quality nursing education. However, there were certain limiting factors which affected students and faculty alike including clinical agency restrictions, licensing and accrediting body requirements, and technology access and use.

Junior level undergraduate students could not exceed the 50% simulation limit so careful calculation and documentation had to be entered by faculty into the shared tracking spreadsheet to ensure clinical experiences were in alignment with the state board of nursing regulations. This could prove challenging in future semesters if there was not ample time or placement to complete the minimum number of hours in direct patient care.

Graduate faculty should consider curricular implications of allowing students to complete practicum requirements concurrently, and should structure programming accordingly. Colleges of nursing should advocate for collaboration with community partners to increase availability of APRN clinical experiences including opportunities to manage healthcare needs which arise during a pandemic crisis. Increasing telemedicine use in direct care delivery should be explored further as a viable clinical learning option for APRN students.

When preparing to implement any full-scale curricular transition, faculty development is an absolute necessity. Ideally, faculty would receive an overview of virtual products available, education on simulation best practices, and in-depth training with technology use. However, the pandemic crisis did not afford the time to research and educate faculty on all virtual products available commercially, nor to facilitate faculty with varied learning curves. Faculty learning needs should be reevaluated regularly in regards to technology use, simulation facilitation, and student evaluation to assess for knowledge gaps. Tailoring learning opportunities such as continuing education courses, open-lab technology sessions, and appropriate reference materials can help to ensure faculty are prepared should the need for online transition be required again in the future.

Conclusion

The future of the ability to return to previous ways of providing clinical learning experiences remains unknown during the ongoing pandemic crisis. Given the limited time constraints to formulate and execute a transition plan to online delivery, further research should be completed regarding the effectiveness of virtual clinical learning experiences, and the planning, implementation and evaluation of full-scale transitions to virtual clinical environments. VS can be utilized as an effective substitute in place of traditional face-to-face clinical

learning experiences in situations where there is a lack of appropriate clinical placement opportunities. Faculty exploring the integration of this methodology into teaching and learning environments should consider specific course and program objectives, the evaluation results and limitations discussed, and review best practices regarding the use of virtual resources.

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