QANE AFI | Quality Advancement in Nursing Education Avancées en formation infirmière | CASN ACESI

Volume 8 | Issue 4 Article 2

Multi-Jurisdictional Evaluation of Sentinel City Virtual Simulation for Community Health Nursing Clinical Education

Andrea Chircop
Dalhousie University |School of Nursing, andrea.chircop@dal.ca

Shelley Cobbett
Dalhousie University, shelley.cobbett@dal.ca

Ruth E. Schofield Professor
McMaster University, School of Nursing, schofir@mcmaster.ca

Catherine Boudreau
Nipissing University & Canadore College, catherineb@nipissingu.ca

Amanda Egert
British Columbia Institute of Technology, Amanda_Egert@bcit.ca

Sylvane Filice
Lakehead University, sylvane.filice@lakeheadu.ca

Andrea Harvey
British Columbia Institute of Technology, andrea_harvey@bcit.ca

Denise Kall
St Lawrence College - Laurentian University, dkallprof@gmail.com

See next page for additional authors

Recommended Citation

Chircop, Andrea; Cobbett, Shelley; Schofield, Ruth E. Professor; Boudreau, Catherine; Egert, Amanda; Filice, Sylvane; Harvey, Andrea; Kall, Denise; and MacDougall, Linda (2022) "Multi-Jurisdictional Evaluation of Sentinel City Virtual Simulation for Community Health Nursing Clinical Education," *Quality Advancement in Nursing Education - Avancées en formation infirmière*: Vol. 8: Iss. 4, Article 2.
DOI: https://doi.org/10.17483/2368-6669.1352

Multi-Jurisdictional Evaluation of Sentinel City Virtual Simulation for Community Health Nursing Clinical Education

Cover Page Footnote

We would like to acknowledge and thank the following research team members: Pat Bethune-Davis, Susan Dennison, Kathryn Edmunds, Sue Foster, Donna Clarke-McMullen, Julie Dyke, Sheila Mcburney, Joanna Pierazzo, Ranjit Dhari, Elsie Tan, and Baiba Zarins. | Nous tenons à reconnaître et à remercier les membres de l'équipe de recherche : Pat Bethune-Davis, Susan Dennison, Kathryn Edmunds, Sue Foster, Donna Clarke-McMullen, Julie Dyke, Sheila Mcburney, Joanna Pierazzo, Ranjit Dhari, Elsie Tan et Baiba Zarins. Cette recherche a été financée par une subvention de fonctionnement du Dalhousie Nursing Research Fund. L'équipe de recherche n'a aucune affiliation, financière ou autre, avec Sentinel City. This research was supported by an operating grant from the Dalhousie Nursing Research Fund. The research team has no affiliation, monetary or otherwise, with Sentinel City®

Authors

Andrea Chircop, Shelley Cobbett, Ruth E. Schofield Professor, Catherine Boudreau, Amanda Egert, Sylvane Filice, Andrea Harvey, Denise Kall, and Linda MacDougall

The broad scope of community health nursing practice within an increasingly complex environment challenges nurse educators to provide nursing students with the best possible learning opportunities. The Canadian Association of Schools of Nursing (CASN, 2010a) *Guidelines for Quality Community Health Nursing Clinical Placements for Baccalaureate Nursing Students* recommend that a robust clinical practice is crucial for students to meet the required entry-level competencies. There were challenges in meeting these guidelines before the COVID-19 pandemic (Valaitis et al., 2008). A theory-practice gap in community/public/population health (from here on referred to as "community") education (Pijl-Zieber et al., 2015) highlights the need for nurse educators to implement multiple pedagogies to enable nursing students to gain the necessary competence to practise community health nursing (Chircop & Cobbett, 2020). A recent scoping review (Leighton et al., 2021) revealed no evidence in support of traditional clinical placements, which are "characterized by a student completing a prescribed period of time in one or more clinical settings and accompanied by a nursing educator or preceptor" (p. 136), as effective learning opportunities, bringing into question the reliance within nursing education on traditional clinical placements. Chircop and Cobbett (2020) found that students who were placed in the Sentinel City (SC) virtual simulation group for their community clinical experience had learning outcomes equal to or better than students who were placed with community agencies or in neighbourhoods. SC is a virtual simulation program for population health nursing. As an online learning platform, it enables students to actively engage in the application of population health theory into practice, including how to conduct a windshield survey and home assessments (https://www.sentinelu.com).

Although positive learning outcomes have been documented for nursing students who participate in virtual simulations, it is unknown whether learning outcomes for students using the same virtual simulation program are comparable across jurisdictions. Nine schools of nursing across Canada (Nova Scotia, Ontario, British Columbia) implemented and evaluated SC to complement the traditional clinical or as an alternative learning experience during the academic year 2020–2021.

Background and Literature Review

With the advent of the COVID-19 pandemic, many nursing schools changed to remote learning and introduced virtual simulation programs as a replacement or enhancement to clinical practice (Fogg et al., 2020; Kim et al., 2021). The swift uptake has been attributed to its potential to replace practice hours, improve health care safety, increase accessibility, and provide safe individualized and self-paced learnings (Foronda et al., 2020; Shea & Rovera, 2021; Verkuyl & Mastrilli, 2017). Verkuyl and Mastrilli (2017) describe virtual simulation as a computerized imitation that consists of (a) a case study of clients that is reasonable, (b) application of knowledge in an activity, and (c) learner engagement in the care-provider role.

The efficacy of virtual simulation in nursing education has been established, and students involved in virtual simulation had learning outcomes that were equal to or better than for those who used traditional methods (Verkuyl & Mastrilli, 2017). The use of virtual simulation for clinical learning has become a significant part of the undergraduate curriculum, offering an evidence-based, effective learning technology (Aebersold, 2018; Hoffman & Argeros, 2021; Weston & Zauche, 2021). It has been described as a promising tool for teaching and learning in health care education (Duff et al., 2016), and as a safe and comfortable place for students to learn skills before proceeding to clinical sites (Aebersold, 2018). It also improves student knowledge and clinical decision-making (Cobbett & Snelgrove-Clarke, 2016). The benefits of virtual

simulation in health care are well documented. Advantages of virtual simulation over in-person simulation and other teaching methods include its safety and convenience, the use of clinical reasoning, and the development of psychomotor, assessment, communication, and management skills (Duff et al., 2016; Foronda et al., 2020; Kononowicz et al., 2019; Nestel & Bearman, 2015; Yuan et al., 2012). It promotes psychological safety because there are no real-life implications (Verkuyl et al., 2021). The Neighborhood, a virtual simulation, documented outstanding benefits over its shortcomings in its use for teaching cultural competence and underrepresented student populations (Giddens et al., 2010, 2012). Literature about the use of virtual reality simulation in community health nursing is slowly emerging, and initial results indicate effectiveness (Hoffman & Argeros, 2021).

Our study was guided by the following research questions:

1. What is the relationship between the use of the SC virtual simulation program for student community/public/population health nursing clinical learning and the ability to meet learning outcomes among different Canadian schools of nursing?

2. How do students' experiences differ and/or align across the jurisdictional sites?

Methodology

Constructivist and experiential learning concepts guided this study (Huang & Liaw, 2018; Poikela & Teräs, 2015). The clinical placements across the different programs represented various learning environments for community health nursing practice. Students worked in teams and were supervised by a clinical instructor to facilitate reflective practice of their learning experiences with SC.

The study population was purposive and included all registered nursing students (n = 1340) in postsecondary nursing programs at nine universities in Ontario, Nova Scotia, and British Columbia that completed their community/public/population health nursing clinical with the use of the SC virtual simulation program.

Survey Design

A descriptive survey was used to carry out an evaluation of the use of SC and student learning outcomes. Data collection was accomplished by using the Student Survey of Virtual Community/Public/Population Health Clinical Experience using Sentinel City, adapted from the pilot study by Chircop and Cobbett (2020). The survey questions were informed by the CASN (2018) *Curricular Guidelines for Integrating Community Health in Baccalaureate Programs of Nursing*. Ethical approval was obtained from all the participating programs in this study. Nursing students received information about the study through an email invitation and were invited to participate via their institution's Schools Listserv (consenting participants completed the online survey using Opinio software). Quantitative data provided demographic statistics to describe the sample and compare student learning outcomes and perceptions of their learning experience, and the qualitative data from open-ended questions provided detailed responses on the use of SC and its future recommendation.

Data Analysis

Data were analyzed using analysis of variant (ANOVA (Welch statistic)) to identify any significant differences among students from each jurisdiction in relation to their perception of the use of SC in meeting their course learning outcomes. Levene's test for equality of variances

provided support for the use of Games-Howell post-hoc analysis to provide further information related to which jurisdictions (schools) were assessed to be different and the direction of the difference. Qualitative data from open-ended responses were analyzed using the 6-step process outlined by Braun and Clarke (2006):

1. Become familiar with the data.
2. Generate initial codes.
3. Search for themes.
4. Review themes.
5. Define themes.
6. Write up the findings.

The data from the two open-ended questions were de-identified and coded. Themes and subthemes were generated and verified with the research team to achieve inter-rater reliability.

Jurisdictional Contexts

This study was carried out by nine colleges/universities in three Canadian provinces. Most of the students across the jurisdictions were in the third and fourth year of their program. Only four sites had students in year 2. The fewest students in a class was 45, while the largest class had 293 students. SC was used for one term in some schools while others used SC over two terms (a combination of either winter, summer, or fall terms). The ratio of clinical instructor to students was between 1:5 and 1:13. The number of clinical hours per week across all jurisdictions ranged from 40 hours in one week to 10 hours per week over 12 weeks, and up to 216 hours over a 6-week period. Hours allocated to SC within the clinical courses were not uniform. Some programs spent equal time on SC and on-site clinical practice, while others had students initially placed in one group (either clinical practice or SC) for six weeks and later changed to the second group. Two programs used SC exclusively, and almost all programs used prebrief and debriefing activities. Since this is an evaluation study based upon constructivism and experiential learning we did not control for the various environments. Rather, our study is based upon inquiry and reflection about the student experience using SC.

Results

Demographics

The overall response rate was 20.2%. A total of 272 students engaged with the survey, with 191 stored completed responses. The numbers and percentages differ because some students chose not to answer some questions. The majority, 131 (58.22%) of the students were between the ages of 21 and 25 years, and most of the students identified as female. There were 91 (40.27%) students in year 4 of their nursing program and 79 (34.96%) students were in year 2. One hundred thirty-one (58.48%) students were in a direct entry program, followed by 53 (23.66%) students from an advanced standing/accelerated program.

Virtual Simulation Experience

There was a small difference in the number of students who had prior experience with any type of computer-based simulation learning and those who did not. About half (n = 110; 48.46%) of the students had experience with simulation learning while 104 (45.81%) students did not.

Similarly, more than half (59.91%) had never participated in a virtual simulation learning experience before using SC. The majority of students across all the jurisdictions rated their proficiency with the use of computers as "proficient" (*n* = 86; 45.26%) and "very proficient" (*n* = 81; 42.63%) and most of them felt "confident" (*n* = 81; 42.63%) and "very confident" (*n* = 89; 46.84%) with the use of computers.

Learning Outcomes

Knowledge/Critical Thinking

In all jurisdictions, most of the students indicated that they were "confident" and "very confident" in their knowledge about the community health nursing (CHN) process, understanding of a population/community health assessment, understanding of how to plan a population health intervention, and ability to integrate the five principles of primary health care into practice. Regarding their ability to apply a population health perspective (upstream thinking), most of the students were "confident" and "very confident" (Table 1). Almost all students (93.62%) were confident and "very confident" in their ability to recognize health inequities, indicating the highest level of confidence (mean = 4.38, *SD* = 0.71)**.**

Table 1

Confidence in Knowledge/Critical Thinking

Items	*N*	NC (%)	SC (%)	NT (%)	C (%)	VC (%)	PNA (%)	*M*	*SD*
Knowledge about CHN process	188	1.06	10.64	14.89	58.51	14.89	--	3.76	0.87
Understanding of a population health assessment	188	1.06	11.17	14.36	55.85	17.55	--	3.78	0.9
Understanding of how to plan a population health intervention	188	4.26	12.23	15.43	53.72	14.36	--	3.62	1.01
Ability to integrate the 5 principles of primary health care into my practice	187	2.67	12.3	18.18	49.73	16.58	0.53	3.67	1
Ability to apply a population health perspective (upstream thinking)	187	2.67	4.81	13.9	53.48	25.13	--	3.94	0.91
Ability to recognize health inequities	188	0.53	2.13	3.72	46.28	47.34	--	4.38	0.71

Note. Adjusted relative frequencies for entries. NC = not confident at all; SC = slightly confident; NT = neutral; C = confident; VC = very confident; PNA = prefer not to answer *M* = mean; *SD* = standard deviation.

Practice

Table 2 illustrates that over 75% of students were "confident" and "very confident" in their ability to collect secondary (already existing) data, collect primary data, critically analyze data, and integrate evidence into planning, implementation, and evaluation of population/community health nursing interventions.

Table 2

Level of Confidence in Practice

Items	*N*	NC (%)	SC (%)	NT (%)	C (%)	VC (%)	*M*	*SD*
Ability to collect secondary data	188	1.6	6.91	12.23	51.6	27.66	3.97	0.91
Ability to collect primary data	188	2.66	10.11	11.17	51.06	25	3.86	0.99
Ability to critically analyze data	188	2.13	7.45	14.89	57.98	17.55	3.81	0.89
Ability to integrate evidence in planning for an implementation	187	2.14	8.56	13.9	55.61	19.79	3.82	0.92
Ability to participate in a population health assessment	188	1.06	8.51	11.17	55.85	23.4	3.92	0.88
Ability to participate in planning for population/community health interventions	187	3.74	11.23	13.37	54.55	17.11	3.7	1
Ability to participate in implementing population/community health interventions	188	3.19	11.17	13.83	54.79	17.02	3.71	0.98
Ability to participate in evaluating populations/community health interventions	188	2.13	12.77	13.3	53.19	18.62	3.73	0.98

Note. Adjusted relative frequencies for entries. NC = not confident at all; SC = slightly confident; NT = neutral; C = confident; VC = very confident; *M* = mean; *SD* = standard deviation.

Communication and Collaboration

The results (Table 3) indicate that most of the students were confident and very confident in their ability to establish relationships with community members, interact with and interview key informants, and communicate with other sectors and professionals working in the community. A large percentage (87.63%) of the students were also confident and very confident in their ability to identify a target population (Table 3).

Table 3

Confidence in Community and Collaboration

Items	*N*	NC (%)	SC (%)	NT (%)	C (%)	VC (%)	*M*	*SD*
In my ability to establish relationships with community members	186	4.3	7.53	12.37	49.46	26.34	3.86	1.03
In my ability to identify a target/priority population	186	2.15	4.3	5.91	59.14	28.49	4.08	0.84
In my ability to interact with and interview key informants	186	8.06	6.99	17.2	48.39	19.35	3.64	1.12
In my ability to communicate with other sectors and professionals working in the community	186	6.45	9.68	15.05	47.31	21.51	3.68	1.11

Note. Adjusted relative frequencies for entries. NC = not confident at all; SC = slightly confident; NT = neutral; C = confident; VC = very confident; M = mean; *SD* = standard deviation.

Legal, Ethical, and Professional Accountability

Most of the students were “confident” in their ability to be an effective team player, and less than 10% were “slightly confident” and “neutral” in their ability to be accountable for their practice (Table 4). The results also showed that more than 90% of students were “confident” and “very confident” in their desire for lifelong learning and in their ability to adhere to ethical practice. Although most of them were “confident” and “very confident” in their ability to locate local, provincial, and national public health policies, 15.51% of students indicated “neutral.”

Table 4

Confidence in Legal, Ethical, and Professional Accountability

Items	*N*	NC (%)	SC (%)	NT (%)	C (%)	VC (%)	PNA (%)	*M*	*SD*
In my ability to be an effective team player/collaborator	187	--	3.21	2.67	44.92	48.66	0.53	4.41	0.71
In my ability to be accountable for my practice	186	--	2.69	3.23	43.01	51.08	--	4.42	0.69
In my desire for life-long learning	188	--	3.19	4.26	41.49	51.06	--	4.4	0.72
In my ability to adhere to ethical practice	188	--	2.13	2.13	43.62	52.13	--	4.46	0.65
In my ability to locate local, provincial, and national public health policies	187	2.14	8.56	15.51	45.99	27.81	--	3.89	0.98

Note. Adjusted relative Frequencies for entries. NC = not confident at all; SC = slightly confident; NT = neutral; C = confident; VC = very confident; *M* = mean; *SD* = standard deviation.

Leadership

Most of the students indicated "confident" and "very confident" in their ability to advocate for health equity. Slightly more than half (55.32%) of students felt "confident" and "very confident" in their ability to influence decision makers, while more than a quarter of the total students (29.26%) indicated "neutral" (Table 5).

Table 5

Descriptive Statistics of Level of Confidence in Leadership

Items	*N*	NC (%)	SC (%)	NT (%)	C (%)	VC (%)	*M*	*SD*
In my ability to advocate for health equity	188	1.06	7.45	7.45	43.62	40.43	4.15	0.92
In my ability to influence decision makers	188	5.32	10.11	29.26	35.64	19.68	3.54	1.08

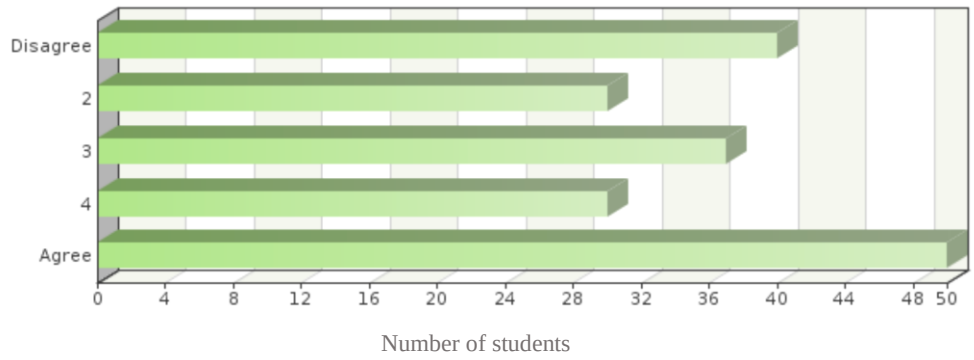
Note. Adjusted relative Frequencies for entries. NC = not confident at all; SC = slightly confident; NT = neutral; C = confident; VC = very confident; M = mean; SD = standard deviation.

Achievement of Course Learning Outcomes

Most students agreed that SC helped them achieve course learning outcomes (Figure 1).

Figure 1

Achievement of Course Learning Outcomes



As Levene's test for equality of variances based upon the mean was significant (4.803, $p = .009$) and the jurisdictional sample sizes varied greatly, ANOVA was used with the Welch statistic, using Games-Howell as post hoc tests. The Welch test indicated that there were statistically significant differences among the jurisdictions (31.850, $p < .001$) concluding that mean scores were not equal across all jurisdictions. Post-hoc analysis was completed using Games-Howell to provide further information related to which jurisdictions were assessed to be different and the direction of the difference. There were statistically significant mean differences among the three jurisdictions (Table 6). Students from jurisdiction 1 (Nova Scotia, mean = 4.26) reported meeting course learning outcomes significantly more often than students from jurisdiction 2 (Ontario, mean = 2.75, $p < .001$) or jurisdiction 3 (BC, mean = 2.11, $p = .005$). There were no statistically significant differences in the students' report of meeting course learning outcomes between jurisdiction 2 (Ontario) and jurisdiction 3 (BC), $p = .442$.

Table 6

Course Learning Outcomes by Jurisdiction

	N	Mean	Std. deviation	Std. error	95% CI for mean	
					Lower bound	Upper bound
Nova Scotia	46	4.2609	1.02056	.15047	3.9578	4.5639
Ontario	124	2.7500	1.40629	.12629	2.5000	3.0000
BC	9	2.1111	1.45297	.48432	.9943	3.2280
Total	179	3.1061	1.48586	.11106	2.8870	3.3253

Student Satisfaction

We asked students about their overall satisfaction with the use of SC for their community clinical learning experience. Students largely disagreed (31%) or slightly disagreed (15.51%) with satisfaction of SC use ($M = 3$, $SD = 1.59$).

Qualitative Responses

Students were asked to provide a written response to two questions: (a) whether they would recommend future use of SC and (b) how SC supported students' learning in the community practicum. The following themes were generated from students' recommendations which were based on what and how they learned about community health nursing, technical issues, value for money, and suggestions for future use.

Learning about Community Health Nursing

Student responses were mixed, with slightly more students indicating they would not recommend future use of SC. Those who would recommend future use told us that the simulation experience highlighted the role of the public health nurse and how SC promoted understanding of community health nursing. An example of a student response was "I think the simulation provided an excellent way to experience the role of a community health nurse and allowed us to be able to apply the knowledge we have learned throughout the semester effectively."

Several students enjoyed using SC due to its convenience, its use during the pandemic and its nonthreatening learning environment. They perceived SC as an opportunity to learn, build, and practise skills useful for community health nursing in a "safe" place: "In the absence of clinical experiences due to clinical placement limitations/a pandemic, I think it gives a decent introduction to the subject matter. It allows students to practice without any real-life consequences first." Some other benefits described included convenience of data collection and retrieval: "For some aspects (mostly numerical data/statistics) it was helpful to have Sentinel City's information right there instead of trying to find statistics online."

Students who did not recommend the future use of SC based their opinion on their experience with SC as being too basic and having a low degree of difficulty, particularly for advanced standing nursing students (years 3 and 4). They described it as being equivalent to a high school diploma: "Right now, it is appropriate for high school, not a degree program." Some students went so far as to say, "I did not learn anything from utilizing Sentinel City".

Students expressed a preference for the use of SC as a complement to in-person clinical experiences for community health nursing and not as an alternative: "SC is good to supplement. I think it should be kept in the curriculum to some extent and should be used along with a real-life clinical experience."

The use of SC was perceived favourably for some data collection assignments, like the windshield survey, and perceived less useful for interviews because questions were preset and students did not have the opportunity to generate their own questions: "The interviewing experience in SC is totally unrealistic; I did not learn how to phrase my questions, follow up with short answers, make the interviewee comfortable, etc."

Technical Issues

The students' responses revealed that they experienced several technical issues with the use of SC. For example, students felt that the software was "outdated" and "difficult to navigate" and was "using too much power." Similarly, they stated that the information within the city was also difficult to obtain and redundant and that interaction within the city was poor: "SC has got potential, but the awkward interface rendered it clunky, frustrating, and time consuming to use. Many modern video games can serve as inspiration for better, more efficient, and more user-friendly experiences."

Value for Money

SC was perceived to consume money and time. Students commented that the time allotted to tasks on SC was too much. Some students admitted to spending only two hours on a task that had four hours allotted to it. Generally, they stated that the time spent on activities could be put to better use. They felt "learning could be done in a day" and that it "would be beneficial for only a portion of the semester." As one student shared, "weeks of Sentinel City was used in my program, and it was far too much. Everything I could learn and get out of the program could be covered in a single clinical day."

The financial cost of SC was also an issue for some students, who stated that there was "no need to purchase this individually" and that group purchase would have been more helpful. Some felt it was too expensive for the quality it delivered, and it was "unfair for students to pay for a computer program." One student stated, "I do not feel I got my money's worth from Sentinel City compared to the rest of the course."

The financial concerns raised by several students may be related to the decisions of some of the programs to ask students to purchase their own SC licence whereas other programs covered this cost for students.

Suggestions for Future Use

Students would recommend future use of SC if the software was modified to reflect Canadian demographics and culture. Some students felt that the framework did not match the Canadian context and the worksheets did not reflect their learning experience with SC: "I would recommend the use of Sentinel City in the future [if]… the software is updated and Canadian."

In reference to the question of how SC supported students learning in the community practicum, four themes emerged from the responses. They include an enhancing understanding of community health nursing, gaining competencies for practice, facilitating group learning, and not meeting expectations for clinical experiences.

Enhancing Understanding of Community Health Nursing. Generally, students perceived that SC supported their learning during community clinical because it provided solid foundational knowledge and opportunities for knowledge application. They felt that it gave a new perspective about community experiences, facilitated understanding of nursing principles of population health, and supported learning by providing an alternative to real life experiences: "It has helped us to identify the principles of nursing practice through the population health approach. It gave us a good insight about community health nursing practice and helped to improve our interview skills and level of nursing knowledge."

Further, students felt SC was applicable to course contents as it "created awareness and understanding of the public health system" and increased knowledge of health inequities.

> I did enjoy that it highlighted a very diverse community with a wide range of social issues. I think more than anything, this experience has truly highlighted the importance of addressing non-medical issues (i.e., the social determinants of health) in order to promote health and well-being.

Gaining Competencies for Practice. The use of SC for clinical activities and its effect on learning was emphasized by students. They responded that SC helped with the windshield survey, helped with understanding the community nursing process, improved knowledge about family and

home health assessment, and supported theory-to-practice transition. A theme that emerged was the development and practice of competencies needed for future nursing practice, including community assessment, data collection and analysis, interviewing, analytical skills, and critical thinking.

> It allowed me to be able to survey various communities within one city. This was helpful because it showed that people have different needs and issues, despite being in the same larger overall area. Sentinel was able to highlight issues within certain population groups: poverty, single parenthood, homelessness, etc. which really bring light to social justice and ensuring health equity to underserved populations.

Facilitating Group Learning. Students stressed the benefits of group discussions, prebrief, debrief, and group meetings over the simulation use. Their "best experience" was discussing the experiences of their peers, and that created opportunity to expand on lessons. Similarly, the contribution of the instructors and facilitators "enriched" the simulation experience. They described the activities chosen by the instructors as very helpful and the support they received to be helpful in identifying crucial community nursing concepts.

> My facilitator did an amazing job facilitating the entire week. Sentinel City provided a great overall experience to witness health inequities of different population groups that we wouldn't have been able to see in real life in such a short amount of time.

Not Meeting Clinical Expectations. Drawbacks identified by students included financial cost, time, software issues, and unsuitability for use in the Canadian context. The students felt although it highlighted the diverse needs of individuals living in a similar area, it was not always applicable to Canadian demographics and the Canadian health care system. They suggested future improvement to reflect Canadian contexts:

> Sentinel City was a good learning experience however I feel that using our own population would be a better experience in completing the worksheets. This would allow us to find, assess and analyze real life data and draw conclusion in our own communities to help us in our practice.

At times, the assignments were described as "tedious," unnecessary, repetitive, and lacking resemblance to activities in real-life placements. Disappointment with learning was also reported by some students stating, "did not fulfil my learning needs," and "experience would have been better without sentinel use."

One of the concerns raised by students was that SC did not compare with real-life experience. They perceived it as being useful only during the pandemic and being preferred as a complement. They believed it "robs me of real-life experience crucial for nursing practice," although some felt it was convenient and easier than physically going into the community.

Other students perceived its contribution to skill development as poor. They saw "no opportunity to develop relationship skills and conversation skills," particularly as it relates to conducting interviews: "I felt limited in not being able to interview people myself."

In summary, the contributions of SC for student learning include an enhanced understanding of community health nursing concepts and practice, support for competency development, and facilitated group learning. Several students were disappointed with the use of SC for community clinical as it did not meet their expectations, largely because it did not reflect

the Canadian context, and they would have preferred an in-person opportunity rather than online learning.

Discussion of Findings

The survey questions and open-ended responses in this study yielded complementary and contradictory findings. While most of the students indicated that SC helped them achieve the required knowledge and skills, just over half the respondents would not recommend future use of SC, and the majority were not satisfied with their learning experiences.

It is important to contextualize the environment in which this study was completed as the data were collected during a global pandemic (November 2020 to August 2021), when the majority of nursing students were engaged in their learning wholly, or partially, online. Campus closures, public health restrictions, altered or cancelled clinical experiences, lack of face-to-face learning, all amid a general milieu of ongoing and rapid change caused increased stress for nursing students. During the pandemic, students were experiencing high levels of stress, anxiety, loneliness, uncertainty, and a lack of support, which contributed to onerous learning (Culp-Roche et al., 2021; Shah & Cheng, 2019; Terzi et al., 2021). Equally important are the findings of Cobbett et al. (2022) that faculty could not maintain a healthy work-life balance with the onset of the pandemic. Factors that impacted the capacity to plan and deliver key requirements for faculty development and recruitment of skilled simulation facilitators in the rapidly shifting context were likely also at play (Bryant et al., 2020; Peachey et al., 2021)

The quantitative results support the use of SC in community nursing clinical practice and its positive contributions to learning outcomes. The variations in learning outcomes across jurisdictions may be attributed to the timing of SC's inclusion in the clinical curriculum. Additionally, previous use of simulations, the year of the student's program, at what point in their program the community clinical course SC was used, and the activities featured in the program could account for these variations. Regarding student demographics, we found that most of the students who used SC in our study were enrolled in their third or fourth year of nursing courses, and 40% of students were enrolled in accelerated programs or had a previous degree. Perhaps the demographic of second-degree and senior nursing students may explain why several students felt SC was suitable for a high school diploma in a sense that the material of clinical activities was not sufficiently challenging and that the knowledge gained was not meeting their expectations.

The students demonstrated high confidence in their ability to improve their knowledge and critical thinking after the use of SC. The results of this study are consistent with findings of other studies in which virtual simulations have had positive effects on knowledge, performance, and clinical judgment skills (Chen et al., 2020; Fogg et al., 2020; Hoffman & Argeros, 2021; Padilha et al., 2019; Sapiano et al., 2018).

In the qualitative responses from our study, students emphasized how SC helped provide foundational knowledge of the core concepts of community health nursing and contributed to knowledge acquisition and application. This speaks to the contribution of SC in the achievement of the CASN (2018) *Curricular Guidelines for Integrating Community Health in Baccalaureate Programs of Nursing*, which formed the basis for the Student Survey of Virtual Community/Public/Population Health Clinical Experience Using Sentinel City.

Kim et al. (2021) recognized virtual simulations for their effectiveness in improving students' skills and abilities in addition to preparing them for health care practice (Tabatabai, 2020). Based on our research, students felt that SC helped increase their ability to think critically and make decisions. Accordingly, this idea is supported by Kononowicz et al. (2019), in which participants mentioned building decision-making, clinical reasoning, and critical thinking skills using virtual simulations.

As stated by CASN (2010b), developing relationships and partnerships is a critical part of the scope of the nursing practice of community health, and Peddle et al. (2016) suggested that virtual simulations do enhance communication skills. Most of the students in this study were confident about their ability to establish relationships with community members and collaborate, yet recognized the difficulties in one way communication with the avatars. Qualitative responses of students revealed a frustration with not being able to ask their own questions during the interviews with citizens. It is noted that SC's interview portion contained predetermined questions and students had no opportunities to ask their own questions.

Despite students' perception that SC assisted with course learning outcomes, some students did not agree with its use and were reluctant to recommend it in the future because of its inadequacies, time consumption, cost, and unsuitability. In contrast, other studies reported students' support and recommendation of future use of virtual simulation based on a positive, enjoyable, and favourable experience (Foronda et al., 2016; Gu et al., 2017; Wright et al., 2018). Other documented benefits of virtual simulation include the flexibility and accessibility of the program, as well as the help it offered during the pandemic. Students appreciated the availability of the programs in their homes. It was found that it provided an ideal space for making and learning from mistakes rather than in a clinical setting (Foronda et al., 2020; Hayden et al., 2014; Kim et al., 2021). Even though the use of SC in our study showed similar benefits, there were also downsides and technical shortcomings reported.

The technical aspect of SC was identified as a hurdle for some students in our study. Students described the software as being outdated and redundant, with several glitches and software issues. In other studies, technical issues were also a major problem for students using virtual simulation (Foronda et al., 2020; Pence, 2022), including several difficulties with navigation (Foronda et al., 2018; Tjoflåt et al., 2018), leading to anxiety, frustration, anger, dissatisfaction, and poor learning outcomes (Anderson et al., 2013; Cobbett & Snelgrove-Clarke, 2016; Foronda, Budhathoki, et al, 2014; Foronda, Lippincott, et al., 2014). This emphasizes the importance of ensuring that technical glitches can be avoided to make the learning experience rewarding (Pence, 2022). Most of the students concluded that they would not recommend future use of SC if there was no improvement in the software and technology.

The activities in SC were not Canadian based, and some students stated that they felt distracted by scenarios that seemed less applicable to their Canadian context. They suggested modification of the software and information to suit the Canadian health care system. The authors are pleased to confirm the recent release of Sentinel City Canada, which was created in response to this feedback from students.

This virtual simulation experience offered opportunities for knowledge application and reflection during prebriefing and debriefing, which is consistent with others' findings (Verkuyl et al., 2017; Verkuyl & Mastrilli, 2017). According to the virtual learning simulation report (CASN, 2021), common methods educators used for assessing student learning and experience following

the virtual simulation included debriefs, reflections, and group discussions. Group discussion enhances learning and promotes collaboration among team members (Verkuyl et al., 2020). The different views, experiences, and perception of the various students during the group discussion also enriches learning (Tosterud et al., 2014; Verkuyl et al., 2020). For our study, group activities were implemented alongside SC in most of the jurisdictions and the experience was favourable for most of the students.

Simulation-based learning, according to Verkuyl et al. (2018), relies heavily on debriefing. Kim et al. (2021) report that briefing sessions included pre-practice orientations and other helpful elements. The participants' responses revealed that students benefited from the prebrief and debrief sessions. The group discussions and support provided by clinical instructors also made the SC experience worthwhile, and the students agreed that it contributed to the positive learning experiences. This aligns with the views of Tyerman et al. (2019) and Verkuyl et al. (2018) that a pre-brief modified to meet the specific needs of the students and simulation activities improved learning outcomes and increased student satisfaction.

Foranda et al. (2020) identified shortcomings of the use of debriefing in virtual simulation related to variations in debriefing or lack of defined debriefing processes. They stated that some debriefing processes were embedded in the virtual simulation while others were instructor led. Lucktar-Flude et al. (2021) suggest a defined and consistent debriefing process and highlight the importance of facilitator debriefing skills. Our study shared similar concerns as not all schools followed an established pattern of debriefing as seen in the jurisdictional contextual data. Although the students described the prebriefing activities as helpful, the variations and lack of uniformity makes it difficult to assess how the SC activities related to learning outcomes across different sites. It appears that the use of SC for clinical learning experiences in community requires a rigorous and solid facilitation of the prebriefing and debriefing session by a clinical instructor who is equally knowledgeable in community health nursing concepts and the pedagogical capacity of the simulation program. Clinical instructors' knowledge about SC as a teaching tool is essential so that learning opportunities can be enhanced by discussion of highly abstract concepts, such as health inequities and their meaning in real-life situations.

To meet the essential components of the community health nursing scope of practice (CASN, 2010a), community health nursing students should have opportunities for practical experience and to begin to develop their independence. A feature that could contribute to this learning experience is an opportunity to self-evaluate interactions with simulation activities. The ability for students to self-evaluate their interventions in SC was identified as inadequate and may be a useful tool for future iterations of the program.

This study revealed several pedagogical advantages of using SC for community clinical learning experiences. Consistent with the constructivist framework (Huang & Liaw, 2018; Poikela & Teräs, 2015) we used to guide our study, it appears that this simulation enables the construction of a consistent learning approach across different clinical groups within one course. This simulation ensured that all students had a similar range of clinical experiences by exploring the same neighbourhoods and engaging in the same clinical activities/assignments. This consistency can introduce an element of fairness because all students participate in the same clinical opportunities as opposed to being randomly placed with a variety of traditional (e.g., public health unit) and non-traditional (e.g., shelter for people experiencing homelessness) community organizations that offer vastly different learning experiences. Random learning opportunities in traditional community clinical placements lack standardization and cannot guarantee that all

students benefit from the same learning opportunities (Leighton et al., 2021). Further, the simulation program offered students an opportunity to explore an entire city with its different neighbourhoods within a short time frame, which may be less achievable in reality by using traditional clinical placement options. This construction of a holistic exposure (i.e., four neighbourhoods in SC) can contribute to a better understanding of highly abstract concepts, such as health inequity among different populations. Moreover, the exposure to a more holistic perspective of population health can illustrate the diversity and complexity of communities, rather than being exposed to one particular community only (e.g., daycare, foodbank). These are all advantages that create a foundation through specific learning experiences, rather than leaving the experience up to chance as it would be with in-person clinical settings where interactions for students with a population cannot always be predicted or controlled and will differ based on clinical day, lengths of time, time of year, etc. In this sense there is also an element of quality that can be ensured with the use of simulation experiences for community nursing clinical. Overall, this cross-jurisdictional study revealed a flexibility with which SC can be used or adapted as a teaching tool at different programs across Canadian jurisdictions and still contribute to the achievement of course learning outcomes for the majority of students.

Limitations

Limitations of this study include the variations in the timing and approaches to incorporating SC in the curriculum, thus limiting generalizability. The programs varied in their use of SC, including placement in the program, and some programs had used SC before this study while others had not. This may possibly explain some of the jurisdictional differences that we found. Other limitations included the use of a convenience sample, students' self-reporting, and the low response rate. It is important to note that data collection for this study occurred during a global pandemic, which could also have affected students' engagement, their perceptions of online learning, and faculty/educator comfort with the pedagogy.

Conclusion and Recommendations

Based on student feedback, the use of SC virtual simulation for community clinical learning in various Canadian jurisdictions positively contributed to achieving desired student learning outcomes. There are, however, significant differences among jurisdictions. The reasons for the different student experiences with the use of SC for community clinical may be explained by the different contexts in each participating program. As educators, we found several advantages with the use of SC, including the ability to create controlled and standardized clinical learning experiences, which contribute to fairness and quality of community clinical education. Our findings support the emerging literature on virtual simulation for community health nursing. The results of this study provide evidence that SC contributes to robust learning experiences for community health nursing clinical.

Our recommendations align with the students' call for a Canadian virtual simulation experience, which has been achieved with the recent release of SC Canada (https://www.sentinelu.com/events/sentinel-city-canada/). We reiterate our previous recommendation (Chircop & Cobbett, 2020) to ideally use virtual simulation as a complementary teaching tool to support student learning through initial simulation experiences, followed by real-life clinical opportunities. Community health nursing is a complex field that requires multiple pedagogies to facilitate the best possible learning outcomes. Consistent with this approach would also be the integration of a variety of clinical activities designed for students at different levels of

education, from novice to senior students. We support the students' recommendation to offer built-in opportunities for student self-evaluation of simulation activities to gauge their achievement of competencies. In addition to obvious technical enhancements to the simulation program, which have been clearly articulated by students, we strongly recommend a robust orientation and professional development program for clinical instructors consistent with the new International Nursing Association for Clinical Simulation and Learning Standards Committee (2021) standards. The required expertise in community health nursing together with solid foundational knowledge of a simulation program for community health nursing and facilitation skills competence during prebriefing and debriefing sessions are necessary for student success.

References

Aebersold, M. (2018). Simulation-based learning: No longer a novelty in undergraduate education. *OJIN: The Online Journal of Issues in Nursing*, *23*(2), 1–1. https://doi.org/10.3912/OJIN.Vol23No02PPT39

Anderson, J. K., Page, A. M., & Wendorf, D. M. (2013). Avatar-assisted case studies. *Nurse Educator*, *38*(3), 106-109. https://doi.org/10.1097/NNE.0b013e31828dc260

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77-101.

Bryant, K., Aebersold, M. L., Jeffries, P. R., & Kardong- Edgren, S. (2020). Innovations in simulation: Nursing leaders exchange of best practices. *Clinical Simulation in Nursing*, *41*, 33–20. https://doi.org/0.1016/j.ecns.2019.09.002

Canadian Association of Schools of Nursing. (2010a). *Guidelines for quality community health nursing clinical placements for baccalaureate nursing students*. https://casn.ca/wp-content/uploads/2014/12/CPGuidelinesFinalMarch.pdf

Canadian Association of Schools of Nursing. (2010b). *The case for healthier Canadians: Nursing workforce education for the 21st century*. https://casn.ca/wp-content/uploads/2014/12/CASN2010draftJune1.pdf

Canadian Association of Schools of Nursing. (2018). *Curricular guidelines for integrating community health in baccalaureate programs of nursing*. https://www.chnc.ca/en/membership/documents/loadDocument?id=1641&download=1

Canadian Association of Schools of Nursing. (2021). *Virtual simulation in nursing education survey report.* https://www.casn.ca/2021/05/virtual-simulation-in-nursing-education-survey-report/

Chircop, A., & Cobbett, S. (2020). Gett'n on the bus: Evaluation of Sentinel City® 3.0 virtual simulation in community/population health clinical placement. *International Journal of Nursing Education Scholarship*, *17*(1), 20190109. https://doi.org/10.1515/ijnes-2019-0109

Cobbett, S., Hansen-Ketchum, P. A., Ezzeddine, N., Nemeth, W. I., & Brennick, D. (2022). Faculty and student online experiences amidst the COVID-19 pandemic: A descriptive study (Part 1). *Quality Advancement in Nursing Education/Avancées en formation infirmière*, *8*(1), Article 4. https://doi.org/10.17483/2368-6669.1317

Cobbett, S., & Snelgrove-Clarke, E. (2016). Virtual versus face-to-face clinical simulation in relation to student knowledge, anxiety, and self-confidence in maternal-newborn nursing: A randomized controlled trial. *Nurse Education Today*, *45*, 179–184. https://doi.org/10.1016/j.nedt.2016.08.004

Culp-Roche, A., Hardin-Fanning, F., Tartayoulle, T., Hampton, D., Hensley, A., Wilson, J., & Thaxton Wiggins, A. (2021). Perception of online teacher self-efficacy: A multi-state study of nursing faculty pivoting courses during COVID-19. *Nursing Education Today*, *106*, 105064. https://doi.org/10.1016/j.nedt.2021.105064

Duff, E., Miller, L., & Bruce, J. (2016). Online virtual simulation and diagnostic reasoning: A scoping review. *Clinical Simulation in Nursing*, *12*(9), 377–384. https://doi.org/10.1016/j.ecns.2016.04.001

Fogg, N., Kubin, L., Wilson, C. E., & Trinka, M. (2020). Using virtual simulation to develop clinical judgment in undergraduate nursing students. *Clinical Simulation in Nursing*, *48*, 55-58. https://doi.org/10. 1016/j.ecns.2020.08.010

Foronda, C., Budhathoki, C., & Salani, D. (2014). Use of multiuser, high-fidelity virtual simulation to teach leadership styles to nursing students. *Nurse Educator*, *39*(5), 209–211. https://doi.org/10.1097/NNE.0000000000000073

Foronda, C. L., Fernandez-Burgos, M., Nadeau, C., Kelley, C. N., & Henry, M. N. (2020). Virtual Simulation in Nursing Education: A Systematic Review Spanning 1996 to 2018. *Simulation in Healthcare: Journal of the Society for Simulation in Healthcare*, *15*(1), 46–54. https://doi.org/10.1097/SIH.0000000000000411

Foronda, C., Lippincott, C., & Gattamorta, K. (2014). Evaluation of virtual simulation in a master's-level nurse education certificate program. *Computers, informatics, nursing: CIN*, *32*(11), 516–522. https://doi.org/10.1097/CIN.0000000000000102

Foronda, C. L., Swoboda, S. M., Henry, M. N., Kamau, E., Sullivan, N., & Hudson, K. W. (2018). Student preferences and perceptions of learning from vSIM for Nursing™. *Nurse Education in Practice*, *33*, 27–32. https://doi.org/10.1016/j.nepr.2018.08.003

Foronda, C. L., Swoboda, S. M., Hudson, K. W., Jones, E., Sullivan, N., Ockimey, J., & Jeffries, P. R. (2016). Evaluation of vSIM for Nursing TM: A trial of innovation. *Clinical Simulation in Nursing*, *12*, 128–131. https://doi.org/10.1016/j.ecns.2015.12.006

Giddens, J., Fogg, L., & Carlson-Sabelli, L. (2010). Learning and engagement with a virtual community by undergraduate nursing students. *Nursing Outlook*, *58*(5), 261–267. https://doi.org/10.1016/j.outlook.2010.08.001

Giddens, J. F., North, S., Carlson-Sabelli, L., Rogers, E., & Fogg, L. (2012). Using a virtual community to enhance cultural awareness. *Journal of Transcultural Nursing: Official Journal of the Transcultural Nursing Society*, *23*(2), 198–204. https://doi.org/10.1177/1043659611434061

Gu, Y., Zou, Z., & Chen, X. (2017). The effects of vSIM for Nursing™ as a teaching strategy on fundamentals of nursing education in undergraduates. *Clinical Simulation in Nursing*, *13*, 194–197. https://doi.org/10.1016/j.ecns.2017.01.005

Hayden, J. K., Smiley, R. A., Alexander, M., Kardong-Edgren, S., & Jeffries, P. R. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation*, *5*(2), S3–S40. https://doi.org/10.1016/S2155-8256(15)30062-4

Hoffman, J. L., & Argeros, G. (2021). Using virtual simulation to teach community health nursing students about public health nursing. *Journal of Community Health Nursing*, *38*(4), 244–252. https://doi.org/10.1080/07370016.2021.1972248

Huang, H. M., & Liaw, S. S. (2018). An analysis of learners' intentions toward virtual reality learning based on constructivist and technology acceptance approaches. *International*

Review of Research in Open and Distributed Learning, *19*(1), 90–115. https://doi.org/10.19173/irrodl.v19i1.2503

International Nursing Association for Clinical Simulation and Learning Standards Committee. (2021). Healthcare simulation standards of best practice™ simulation glossary. *Clinical Simulation in Nursing*, *58*, 57–65. https://doi.org/10.1016/j.ecns.2021.08.017

Kim, M. J., Kang, H. S., & De Gagne, J. C. (2021). Nursing Students' Perceptions and Experiences of Using Virtual Simulation During the COVID-19 Pandemic. *Clinical Simulation in Nursing*, *60*, 11–17. https://doi.org/10.1016/j.ecns.2021.06.010

Kononowicz, A. A., Woodham, L. A., Edelbring, S., Stathakarou, N., Davies, D., Saxena, N., Tudor Car, L., Carlstedt-Duke, J., Car, J., & Zary, N. (2019). Virtual Patient Simulations in Health Professions Education: Systematic Review and Meta-Analysis by the Digital Health Education Collaboration. *Journal of Medical Internet Research*, *21*(7), e14676. https://doi.org/10.2196/14676

Leighton, K., Kardong-Edgren, S., McNelis, A., Foisy-Doll, C., & Sullo, E. (2021). Traditional clinical outcomes in prelicensure nursing education: An empty systematic review. *Journal of Nursing Education*, *60*(3), 136–142. https://doi.org/10.3928/01484834-20210222-03

Lucktar-Flude, M., Tyerman, J., Verkuyl, M., & Gumapac, N. (2021). Effectiveness of debriefing methods for virtual simulation: A systematic review. *Clinical Simulation in Nursing*, 57, 18–30. https://doi.org/10.1016/j.ecns.2021.04.009

Nestel, D., & Bearman, M. (2015). Theory and simulation-based education: Definitions, worldviews and applications. *Clinical Simulation in Nursing*, *11*(8), 349–354 https://doi.org/10.1016/j.ecns.2015.05.013

Padilha, J. M., Machado, P. P., Ribeiro, A., Ramos, J., & Costa, P. (2019). Clinical Virtual Simulation in Nursing Education: Randomized Controlled Trial. *Journal of medical Internet Research*, *21*(3), e11529. https://doi.org/10.2196/11529

Peachey, L., McParland, T., Goldsworthy, S., & Williams, V. (2021). P stands for pivot: Pivoting face-to-face practicum to virtual simulation during the pandemic. *Clinical Simulation in Nursing*, 57, 53–58. https://doi.org/10.1016/j.ecns.2021.04.021

Peddle, M., Bearman, M., & Nestel, D. (2016). Virtual patients and nontechnical skills in undergraduate health professional education: An integrative review. *Clinical Simulation in Nursing*, *12*(9), 400–410. https://doi.org/10.1016/j.ecns.2016.04.004

Pence, P. L. (2022). Student satisfaction and self-confidence in learning with virtual simulations. *Teaching and Learning in Nursing, 17*, 31–35. https://doi.org/10.10 16/j.teln.2021.07.008

Pijl-Zieber, E. M., Barton, S., Awosoga, O., & Konkin, J. (2015). Disconnects in pedagogy and practice in community health nursing clinical experiences: Qualitative findings of a mixed method study. *Nurse Education Today*, *35*(10), e43–e48. https://doi.org/10.1016/j.nedt.2015.08.012

Poikela, P., & Teräs, M. (2015). Pedagogical models of learning in nursing simulation. *Educational Research and Reviews*, *10*(8), 1023–1033.

Sapiano, A. B., Sammut, R., & Trapani, J. (2018). The effectiveness of virtual simulation in improving student nurses' knowledge and performance during patient deterioration: A pre and post test design. *Nurse Education Today*, *62*, 128–133. https://doi.org/10.1016/j.nedt.2017.12. 025

Shah, M., & Cheng, M. (2019). Exploring factors impacting student engagement in open access courses. *Open Learn*, *34*(2), 187–202. https://doi.org/10.1080/02680513.2018.1508337

Shea, K. L., & Rovera, E. J. (2021). Preparing for the COVID-19 pandemic and its impact on a nursing simulation curriculum. *The Journal of Nursing Education*, *60*(1), 52–55. https://doi.org/10.3928/01484834-20201217-12

Tabatabai, S. (2020). Simulations and virtual learning supporting clinical education during the COVID 19 pandemic. *Advances in Medical Education and Practice*, *11*, 513–516. https://doi.org/10.2147/AMEP.S257750

Terzi, B., Azizoglu, F., & Ozhan, F. (2021). Factors affecting attitudes of nursing students towards distance education during the COVID-19 pandemic: A web-based cross-sectional survey. *Perspectives in Psychiatric Care*, *57*(4), 1765–1773. https://doi.org/10.1111/ppc.12747

Tjoflåt, I., Brandeggen, T. K., Strandberg, E. S., Dyrstad, D. N., & Husebø, S. E. (2018). Norwegian nursing students' evaluation of vSim® for Nursing. *Advances in Simulation*, *3*, 10. https://doi.org/10.1186/s41077-018-0070-9

Tosterud, R., Hall-Lord, M.-L., Petzäll, K., & Hedelin, B. (2014). Debriefing in simulation conducted in small and large groups : Nursing students' experiences. *Journal of Nursing Education and Practice*, *4*(9), 173–182. https://doi.org/10.5430/jnep.v4n9p173

Tyerman, J., Luctkar-Flude, M., Graham, L., Coffey, S., & Olsen-Lynch, E. (2019). A systematic review of health care presimulation preparation and briefing effectiveness. *Clinical Simulation in Nursing*, *27*, 12–25. https://doi.org/10.1016/j.ecns.2018.11.002

Valaitis, R. K., Rajsic, C. J., Cohen, B., Leeseberg Stamler, L., Meagher-Stewart, D., & Froude, S. A. (2008). Preparing the community health nursing workforce: Internal and external enablers and challenges influencing undergraduate nursing programs in Canada. *International Journal of Nursing Education Scholarship*, *5*, Article 22. https://doi.org/10.2202/1548-923X.1518

Verkuyl, M., Atack, L., Kamstra-Cooper, K., & Mastrilli, P. (2020). Virtual gaming simulation: An interview study of nurse educators. *Simulation Gaming*, *51*(4), 537–549. https://doi.org/10.1177%2F1046878120904399

Verkuyl, M., Atack, L., McCulloch, T., Liu, L., Betts, L., Lapum, J. L., Hughes, M., Mastrilli, P., & Romaniuk, D. (2018). Comparison of debriefing methods after a virtual simulation: An experiment. *Clinical Simulation in Nursing*, *19*, 1–7. https://doi.org/10.1016/j.ecns.2018.03.002

Verkuyl, M., Lapum, J. L., St-Amant, O., Hughes, M., & Romaniuk, D. (2021). Curricular uptake of virtual gaming simulation in nursing education. *Nurse Education in Practice*, *50*, 102967. https://doi.org/10.1016/j.nepr.2021.102967

Verkuyl, M., & Mastrilli, P. (2017). Virtual simulations in nursing education: A scoping review. *Journal of Nursing Health Science*, *3*(2), 39–47. https://doi.org/10.1016/j.ecns.2019.02.001

Weston, J., & Zauche, L. H. (2021). Comparison of virtual simulation to clinical practice for prelicensure nursing students in pediatrics. *Nurse Educator*, *46*(5), E95–E98. https://doi.org/10.1097/NNE.0000000000000946

Wright, R. R., Tinnon, E. A., & Newton, R. H. (2018). Evaluation of vSim for Nursing in an adult health nursing course: A multisite pilot study. *Computers, Informatics, Nursing: CIN*, *36*(2), 84–89. https://doi.org/10.1097/CIN.0000000000000388

Yuan, H. B., Williams, B. A., & Fang, J. B. (2012). The contribution of high-fidelity simulation to nursing students' confidence and competence: A systematic review. *International Nursing Review*, *59*(1), 26–33. https://doi.org/10.1111/j.1466-7657.2011.00964.x