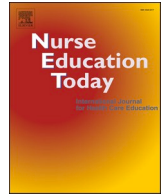




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



## Research article

# COVID 19-transformed nursing education and communication competency: Testing COMFORT educational resources



Elaine Wittenberg<sup>a,\*</sup>, Joy V. Goldsmith<sup>b</sup>, Chiahui Chen<sup>c</sup>, Maryjo Prince-Paul<sup>d</sup>, Beverly Capper<sup>e</sup>

<sup>a</sup> California State University Los Angeles, Department of Communication Studies, Los Angeles, CA, USA

<sup>b</sup> University of Memphis, Department of Communication and Film, Memphis, TN, USA

<sup>c</sup> From University at Buffalo-The State University of New York, School of Nursing, Buffalo, NY, USA

<sup>d</sup> Palliative Care and Serious Illness Consultant, Cleveland, OH, USA

<sup>e</sup> Case Western Reserve University, Frances Payne Bolton School of Nursing, Cleveland, OH, USA

## ARTICLE INFO

## Keywords:

Nursing education

COVID-19

Communication competency

Learning modules

## ABSTRACT

**Background:** The COVID-19 pandemic brought a disruption to nurse education for both nursing faculty and students as all non-clinical nurse education courses worldwide moved to distance or online learning. The sudden shift to online education meant the loss of traditional activities for students to learn communication skills creating a critical demand for open educational resources for students and nursing faculty. Tools to support nursing faculty development for teaching communication are nearly non-existent and pedagogical content knowledge is needed.

**Objectives:** The purpose of this study was to test two *COMFORT COVID-19 Communication Modules* (PPE and Video/Phone) for undergraduate nursing students and evaluate student communication competency post-intervention.

**Design:** This pre-post study includes qualitative and quantitative data collected to evaluate student communication competency post-intervention.

**Settings:** Undergraduate Bachelor of Science in Nursing (BSN) students at four university campuses in the Pacific and MidSouth regions of the United States.

**Participants:** BSN nursing students ( $n = 197$ ) predominantly in the third year of study ( $n = 138$ , 70%).

**Methods:** Students completed online modules as part of a nursing course. Faculty provided information and a link to access online learning modules. A pre-post assessment was completed for each module.

**Results:** Significant statistical differences were found across variables of communication attitude, knowledge, and skill across both modules.

**Conclusions:** As nursing education in the United States shifts to competency-based education which emphasizes skill development across the BSN program, it is imperative to establish communication learning objectives that are measurable and ensure communication theory and evidence-based practice is part of curriculum content.

## 1. Introduction

The COVID-19 pandemic created strict patient isolation requirements, increased utilization of personal protective equipment, and brought a disruption to nurse education for both nursing faculty and students. All non-clinical nurse education courses worldwide moved to remote or online learning. Nursing faculty were challenged to structure remote learning, with some facing new technology learning curves, and little guidance for implementing blended learning for teaching

undergraduate clinical skills (McDonald et al., 2018). The sudden shift to online education also meant the loss of simulation activities for students to develop communication skills (Haslam, 2021), creating a critical demand for free educational resources and a need to support nursing faculty responsible for communication training in the undergraduate nursing curriculum (Hay et al., 2017).

In nurse training, communication is treated as a fundamental value, an organic and natural skill, and more recently has been recognized as a rigorous evidence-based social science (Wittenberg et al., 2020). The

\* Corresponding author at: Department of Communication Studies, California State University Los Angeles, 5151 State University Drive, Los Angeles, CA 90032, USA.

E-mail address: [ewitten2@calstatela.edu](mailto:ewitten2@calstatela.edu) (E. Wittenberg).

<https://doi.org/10.1016/j.nedt.2021.105105>

Received 14 June 2021; Received in revised form 20 July 2021; Accepted 13 August 2021

Available online 19 August 2021

0260-6917/© 2021 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

complexity and depth of communication required by nurses is not a natural skill but something that is developed with good education and practice. Without formal training of evidence-based communication science, nursing schools and faculty cannot practice and teach effective and reliable communication concepts and practices. Task communication practices in the United States and some other countries such as hand-offs (transfer of information), SBAR (Situation-Background-Assessment-Recommendation), and IPASS (hand-off practice) are taught and assessed with some regularity in schools of nursing (The Patient Safety Advisory Group, 2017, September 12). But training students in task communication without comprehensive and empathic relational communication practices (i.e., complex and nuanced interactions about goals of care, decision making, cultural sensitivity, health literacy, contingency planning, trust, patient-centered care, and patient/caregiver outcomes and more) leaves faculty to their own devices to develop objectives and competences (Wittenberg et al., in press). Communication in nursing is a term that receives splintered approaches in education; namely, a transmission of information, a practice of exhibiting empathy, and a completion of tasks. However, the term ‘communication’ is a container for all of those engagements and more, which ultimately results in shared meaning between the nurse and patient, the nurse and team, and the nurse and family. To engage this complex endeavor, both task and relational dimensions of communication must be taught to nursing students.

Relatedly, schools of nursing prepare students for licensure (NCLEX state licensure exam in the United States). Schools have the clear goal of teaching the necessary content to support student pass rates. Currently (a) there are no consistent competencies, learning objectives, or learning outcomes for evidence-based communication training in nursing curricula (Wittenberg et al., in press); (b) there are no competency-based outcome measurement tools for assessing communication training (Kerr et al., 2020); (c) there are no evidence-based health communication materials for remote communication training delivery; and, (d) there is no evidence-based health communication training content specifically geared to prepare nurses for telehealth communication. As remote teaching is likely to play a larger role in the COVID-19-transformed nursing education environment, there is a need for resource content and evaluation methods for online communication training (Hay et al., 2017).

In the United States, competencies for undergraduate nursing programs were revised this year and assessment has shifted focus to student demonstration of skills (American Association of Colleges of Nursing, 2021). Known as competency-based education, this approach to nursing competencies aligns with accreditation requirements for the demonstration of measurable outcomes of program effectiveness. However, nursing schools have reduced budgets, faculty shortages, and limited resources for educational development. Nursing faculty is overwhelmed by new teaching modes, balancing instructional and clinical responsibilities, and an increased load of pedagogical demands in delivering remote instruction. All schools of nursing in the United States mandated a COVID-19 move to remote learning during the 2020-2021 academic year, which included clinical experience for many students early in their programs. If adjustments are not made to online nursing pedagogy and content, there is a potential risk of students not meeting registration requirements, which could produce a shortage in nursing during pandemic recovery. Tools to support nursing faculty development for teaching evidence-based health communication are nearly non-existent and pedagogical content knowledge is needed (Back et al., 2019).

Evidence-based and theory-driven content that teaches nursing communication is articulated and delivered through the COMFORT Communication Project. The COMFORT Communication Project is a unique program that offers open educational resources (free and accessible) to implement patient-centered communication in difficult situations. The pandemic presented an urgent and profound need to establish COVID-19-specific health communication support resources

for nursing faculty and students. Using the COMFORT Model, comprised of seven essential health communication principles represented as an acronym (C-Connect; O-Options; M-Making meaning; F-Family caregivers; O-Openings; R-Relating; T-Team), we developed an educational intervention with a team including health communication researchers, critical care nurse clinician and researcher, nursing faculty and a nurse educator. The intervention, known as the *COMFORT COVID-19 Communication Modules*, consists of two learning modules and a free smartphone resource called the *COMFORT Communication App*. The two modules include educational content about health communication integrating personal protective equipment (PPE) and video/phone call interactions with intended learning outcomes specific to communication attitude, communication knowledge, and communication skill. Table 1 presents intervention content. The application was developed as an open educational resource to support student learning and health communication skill development. The application (app) is a mobile health translation of the COMFORT model that includes health communication practices for nursing care. The design and development of the COMFORT Model and teaching are described in detail elsewhere (Wittenberg et al., 2017).

The purpose of this study was to test the *COMFORT COVID-19*

**Table 1**

Content and app resource employed in the COMFORT COVID-19 Communication Modules.

Module topic	Module content	Content referenced in the COMFORT communication app <sup>a</sup>
COVID-19 communication: video/phone calls	COVID-19 context: <ul style="list-style-type: none"> <li>• One nurse's experience with COVID and video/phone calls (video)</li> <li>• Context of COVID-19 patient care</li> <li>• Role of the nurse in video/phone calls</li> </ul> Communication theory/concepts: <ul style="list-style-type: none"> <li>• Cultural humility (video)</li> <li>• Plain Language and Health Literacy (video)</li> <li>• Learn how to use Plain Language</li> </ul>	Assess family experience with technology  Address myths about technology  Elicit family participation during call  COVID-Simply Said (common terms written in plain language)
COVID-19 communication: personal protective equipment (PPE)	COVID-19 context: <ul style="list-style-type: none"> <li>• Nurse experiences with COVID-19 and PPE (video)</li> <li>• PPE communication barriers in COVID-19 patient care</li> <li>• Challenge of conveying support when wearing PPE</li> </ul> Communication theory/concepts: <ul style="list-style-type: none"> <li>• Difficult information is defined by patient/family</li> <li>• “Being with” Patient/Family</li> <li>• Mindful communication practices</li> <li>• Different perspectives of nurse and patient/family (video)</li> <li>• Using stories to learn and share</li> </ul>	Reconnect through PPE  Being present for patient/family Essential patient questions  Listening to how the story is told  Deeper conversations and how to explore emotions, coping, and support  Nonverbal communication

<sup>a</sup> Access for free at [app.communicatecomfort.com](http://app.communicatecomfort.com)

Communication Modules for undergraduate nursing students and evaluate student communication competency across attitude, knowledge, and skill, post-intervention.

## 2. Methods

This study uses a pre-post design to test the effects of an educational intervention and evaluate student communication competency post-intervention. Qualitative and quantitative data were collected from student participants evaluating the intervention.

### 2.1. Participants and data collection

Undergraduate BSN nursing students at four university campuses (three in California, one in Ohio) were provided the opportunity to complete the intervention as extra credit in their nursing coursework. Students were emailed directions for online access to modules by their instructor of record and were not required to complete both modules to be included in the study.

### 2.2. Data collection tools

A combination of quantitative and qualitative assessment measures were used to test effectiveness and evaluate competency-based outcomes for communication attitude, knowledge, and skill. For both modules, students completed a pre-post survey consisting of communication attitude and knowledge measures as well as an open-ended case study response which was used to measure applied communication knowledge and skill. In addition, demographic information was collected and included participant age, gender, race/ethnicity, and year of study. The study was reviewed and approved by the university institutional review board (#1698586-1) and student participation in both the study and intervention was voluntary. Completion of the module(s) served as informed consent.

#### 2.2.1. Communication attitude

To measure communication attitude, a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used in the pre-post assessment. In the PPE module, five items were adapted from the "Being With" subscale of the Presence of Nursing Scale-RN Version (PONS-RN) (Kostovich et al., 2016), a valid and reliable scale instrument used by registered nurses to rate their ability to be present with their patients. Using a version of the PONS-RN that assessed student attitudes towards being present with patients (Kostovich et al., 2017), items were re-worded for this study to reflect attitudinal statements. In this study, the scale was reliable ( $\alpha = 0.79$ ). In the Video/Phone Call module, three items were adapted from the Attitudes towards Telehealth measure used in prior research (Ghaddar et al., 2020). In this study, the scale was reliable ( $\alpha = 0.85$ ). For all attitude measures, higher scores indicated more positive attitudes.

#### 2.2.2. Communication knowledge

Communication knowledge was assessed in two ways. First, five multiple choice items based on the researchers' prior online education research (Wittenberg et al., 2018; Wittenberg et al., 2021b; Wittenberg-Lyles et al., 2014) were included in the pre-post assessment of each module. Multiple choice knowledge items included communication concepts and vocabulary from the COMFORT model and were developed by the interdisciplinary research team through a consensus process. The number of items correct were compared pre- and post-assessment, with higher scores reflecting increased knowledge. Second, applied communication knowledge was assessed by the student's ability to recognize health communication principles provided within the smartphone app in the context of a case study scenario.

### 2.2.3. Communication skill

The same case study scenario used in assessing communication knowledge included an additional open-ended question for assessing communication skill. Students were asked to use the smartphone app to find information and provide a response. In the PPE module, students were asked to describe nonverbal communication behaviors that would exhibit being present with the patient. In the Video/Phone call module, students were asked to produce plain language to explain a medication and symptom.

### 2.3. Data analysis

To test the effect of the intervention, we used paired samples *t*-test to compare mean scores between pre- and post-assessment for communication attitude and knowledge items. A *p*-value  $< .05$  was the benchmark for determining statistical significance. Data entry and analysis was conducted using SPSS version 25.0. To evaluate student communication competency post-intervention, open-ended responses were coded by two members of the research team. Open-ended responses to case-based scenarios were coded by assessing students' ability to navigate to the correct section of the application (referred to as app from here forward), explain their selection of content (communication knowledge), and employ specific communication techniques (communication skill). Competency categories were used to determine communication competency in open-ended responses and frequencies were calculated.

## 3. Results

### 3.1. Participants

Overall, 197 nursing students participated, with 70 students completing both intervention modules offered. Students who participated in this study had a mean age of 22.77 years (range: 19-53 years), 83% were ( $n = 164$ ) female, 16% ( $n = 32$ ) were male, and one student reported gender non-conforming. The majority of students identified as Caucasian ( $n = 88$ , 44%), followed by Asian/Pacific Islander ( $n = 80$ , 40%), Hispanic/Latino ( $n = 14$ , 3%), Black ( $n = 3$ ), Multiracial ( $n = 5$ ), and Arab ( $n = 2$ ). Five students did not wish to report this information. Students were predominantly in their third year of study ( $n = 138$ , 70%), followed by first year ( $n = 24$ ), fourth year ( $n = 24$ ), and second year students ( $n = 11$ ).

### 3.2. Effects of the COMFORT COVID-19 communication modules

#### 3.2.1. Communication attitude

There was a significant pre and post statistical difference for communication attitudes in both modules. In the PPE module, attitudes towards being present with the patient increased from pre-assessment ( $M = 4.23$ ,  $SD = 0.52$ ) to post-assessment ( $M = 4.54$ ,  $SD = 0.58$ );  $t(141) = -4.777$ ,  $p < .000$ . In the Video/Phone call module, communication attitude towards telehealth also increased from pre-assessment ( $M = 3.86$ ,  $SD = 0.65$ ) to post-assessment ( $M = 4.24$ ,  $SD = 0.65$ ) for;  $t(115) = -4.306$ ,  $p < .000$ .

#### 3.2.2. Communication knowledge

There was a significant statistical difference for communication knowledge in both modules. There was a significant increase in communication knowledge in the PPE module between pre-assessment ( $M = 3.79$ ,  $SD = 0.87$ ) and post-assessment ( $M = 4.48$ ,  $SD = 0.73$ ),  $t(141) = -0.503$ ,  $p < .000$  and in the Video/Phone call module ( $M = 4.47$ ,  $SD = 0.71$ ;  $M = 4.84$ ,  $SD = 0.36$ );  $t(116) = -0.254$ ,  $p < .000$ .

### 3.3. Evaluation of student communication competency

Open-ended responses were used to assess student competency in the video/phone call module ( $n = 117$ , 59%) and protective personal

equipment ( $n = 150$ , 75%). Competency in communication knowledge was evaluated by the student's ability to navigate the smartphone app. Competency was achieved if the student could find the correct section of the app and provided a general response. The majority of students (79.8%) reached advanced competency or competency for communication knowledge in the Video/Phone call module; however, only 55% of students reached competency or advanced competency in communication knowledge for the PPE module. Competency in communication skill was evaluated by the student's ability to apply learned behaviors to the context of the case scenario. In the Video/Phone call module, 68% of student responses met competency or advanced competency by providing a response that included plain language to describe a medication and symptom. In the PPE module, 68% of student responses met competency or advanced competency by identifying two or more nonverbal communication behaviors in the context of the case scenario. Table 2 presents frequencies and exemplars for leveled responses.

#### 4. Discussion

This study evaluated the effect of an educational intervention for COVID-19 communication, specifically examining student communication competency post-intervention. Our findings show that the *COMFORT COVID-19 Communication Modules* have promise as an educational intervention that improves communication attitudes, knowledge, and skills among undergraduate nursing students. This study is pioneering in establishing competency-based online education for undergraduate nursing students in the area of communication and contributes to the theory and practice of health communication.

This study found that the intervention made a positive contribution to the development of students' attitudes towards communication and communication knowledge. Previous research using computer simulated-based interactive communication education has not included assessment of communication attitudes as a learning outcome (Choi et al., 2020), however positive communication attitudes are associated with nursing students' positive perception of their ability to use existing resources (Skodova et al., 2018). Adequate communication education is not provided in undergraduate nursing textbooks used in the United States (Carmack and Harville, 2019), with content that makes cursory mention of communication without dissecting its components, vocabulary, and the evidence associated with the science of communication. Attitudes towards communication are a recognized barrier in medical education, as positive attitudes decrease over the duration of medical training programs (Ruiz Moral et al., 2019). Including communication attitudes as a key content area and assessment measure in nurse communication curriculum is essential to determine if the same effect is true in nursing education.

Findings from this study further demonstrate the beneficial effect of smartphone use in clinical nursing education, consistent with recent meta-analysis findings (Chen et al., 2021). In this study, the *COMFORT Communication App* was used as an open educational resource to guide practice skills for nurse communication, an appropriate tool given that the majority of nursing students use smartphones not only in other coursework but also in the clinical setting (Greer et al., 2019). Undergraduate nurses report that smartphone apps provide helpful and convenient access to evidence-based research materials (George et al., 2017) and develop skills and confidence related to their professional career (Gallegos and Nakashima, 2018). Nursing students using a smartphone app when interacting with patients reported greater comfort with patient education skills and enhanced communication skills overall (George et al., 2017). Students emphasized the value of using apps to prepare immediately before encounters with patient and family (Lall et al., 2019). Study findings here support the expansion and further integration of smartphone apps as a nursing educational component.

Still, future research is needed understand the efficacy of student app use in different instructional mediums as prior research has established that undergraduate nursing students' knowledge, skills, abilities, and

**Table 2**  
Competency-based assessment of COMFORT COVID-19 communication modules with examples of data.

Learning objective	Competency criteria for coding open-response to scenario using app	Results	Examples from student responses
<i>COVID-19 communication: video/phone calls (n = 117)</i>			
Recognize communication principles of health literacy and cultural humility in patient care	<b>No competency</b> Wrong section of app or answer is not applicable and no explanation	32 (28%)	"I would make sure that I have a translator and make sure to stop frequently and let her ask questions as we go."
	<b>Competency</b> Correct section of the app with general, brief explanation	26 (22.8%)	"You can first ask, "do you feel comfortable with a telehealth visit?" to gauge how the mother feels. Additionally, you can ask, "have you used telehealth before?" so that you know if the patient is familiar with it."
	<b>Advanced competency</b> Correct section of the app and vivid and highly contextualized explanation	65 (57%)	"I would ask if they had heard of telehealth before and explain if not as well as further assessing their technological literacy. If this is a brand new concept to Steafon's mother it might be anxiety-inducing in a situation which is already very stressful. Addressing her concerns right away will help to put her more at ease. I would then ask if Steafon's mother had ever had a telehealth visit before and if so, would ask her how comfortable she was with the visit. If she was uncomfortable, perhaps I can find out the reason and alter my approach to address her concerns. If she hadn't had a telehealth visit before, I would want to assess her technology comfort levels."
Use plain language in a telehealth interaction to discuss symptoms and side effects	<b>No competency</b> Plain language for medication or symptom but not both	29 (25.6%)	"The cause of dyspnea is the newly found virus goes to the lungs and destroys lung tissues where the oxygen and carbon dioxide exchange and with no place to exchange oxygen into the blood, the person will have hard time to breathe."
	<b>Competency</b> Plain language for medication and symptom	43 (38%)	"When a person has difficulty breathing, we can give a medication that will take away swelling and make it easier to breath."
	<b>Advanced competency</b> Plain language for	34 (30%)	"Steafon is having difficulty breathing, we will give him a

(continued on next page)

Table 2 (continued)

Learning objective	Competency criteria for coding open-response to scenario using app	Results	Examples from student responses
	medication and symptom provided in context		<i>medication called dexamethasone, a medicine that takes away the swelling. This will allow Steafon to breath better."</i>
<i>COVID-19 communication: personal protective equipment (n = 150)</i>			
Recognize communication principles of 'being with' patient	<b>No competency</b> Wrong section of app or answer is not applicable and no explanation	54 (36%)	<i>"I would sit down and listen. Perhaps suggest that he facetime his partner."</i>
	<b>Competency</b> Correct section of the app with general, brief explanation	32 (21%)	<i>"Manuel can communicate support by touching Alvin's shoulder, sitting at the bedside, and changing his tone of speech to be more supportive."</i>
	<b>Advanced competency</b> Correct section of the app and vivid and highly contextualized explanation	51 (34%)	<i>"Comfort the patient by talking at a slower pace so Alvin can see that Manuel cares and that Manuel is not in a rush to leave to take care of his other patients. It shows that Manuel is taking his time with Alvin. Pausing would also help accomplish that."</i>
Use nonverbal communication techniques when PPE is a barrier	<b>No competency</b> General list of nonverbal behaviors with no explanation	37 (24.6%)	<i>"Two non-verbal behaviors can include direct eye contact and having an open body stance."</i>
	<b>Competency</b> Two or more behaviors identified with general explanation	66 (44%)	<i>"Kinesics, such as leaning in when listening to the patient, indicates that Manuel is engaged in what Alvin is saying. Haptics, such as holding Alvin's hand, facilitates connection between Alvin and Manuel and provides Alvin comfort."</i>
	<b>Advanced competency</b> Two or more behaviors identified and vivid and highly contextualized explanation	36 (24%)	<i>"Vocalics can be used. Expressing yourself in a coherent manner with the right tone and speed will improve Manuel's ability to communicate with Alvin. Changing how you use your voice will be beneficial since the voice is the main thing Manuel has to interact with the patient."</i>  <i>Artifacts can be used. Having something comforting available and in the room will help Alvin feel more at peace. Only allowing him to have an unwelcoming and sterile hospital environment would be scary. Creating a space</i>

Table 2 (continued)

Learning objective	Competency criteria for coding open-response to scenario using app	Results	Examples from student responses
			<i>of comfort with artifacts will help Manuel set up a space in which Alvin can feel comfortable."</i>

behaviors are not impacted by use of simulation instruction over traditional clinical hours (Mancini et al., 2019). Future testing using an objective structured clinical examination (OSCE) activity that requires students to use the app to prepare and problem-solve would require robust design and sound pedagogy yet would yield quantitative measurement of communication skills. The current study used the app as a supplemental education tool meant to reinforce existing course content. Additional work is necessary to assess communication competency in courses and OSCE activities that integrate the app content along with instructional content.

The impact of communication training interventions is difficult to measure among nurses (Kerr et al., 2020) and the COMFORT COVID-19 Communication Modules offer standardized outcome measurement tools consistent with competency-based education. Both students and nursing faculty see value in using technology to teach communication (Shorey et al., 2020), supporting additional nurse communication instruction online and using smartphone apps. Currently, the COMFORT COVID-19 Communication Modules and COMFORT Communication App are the only open educational resources available for nursing faculty (The COMFORT Educational Project, 2021) that integrate communication science learning objectives that are measurable; additional testing is needed to ensure communication theory and evidence-based practice is part of curriculum content. However faculty training can be a barrier to adopting the use of the app as an educational resource (George et al., 2017). Integrating smartphone apps into nursing education requires additional support and time for nurse educators (Lall et al., 2019).

4.1. Study limitations

To our knowledge, this is the first study to evaluate competency-based education in online communication training for undergraduate nursing students. However, there are several limitations to be noted. Including the COMFORT COVID-19 Communication Modules into already existing coursework proved to be difficult and researchers had to rely on nursing faculty who elected to offer the modules. Essentially, this convenient sampling approach resulted in data collection across four different BSN program sites presenting varied demographics, curricular offerings, and exposures to communication education and simulation activities. This study did not account for students' current or prior coursework, and while the majority of the sample was in their third year the scope of this work could not account for year of study and its impact. Prior research has found that fourth year students have the highest clinical competency (Kang et al., 2021), and thus additional research is needed to determine the best year(s) of study for the inclusion of evidence-based communication training. Finally, a third of the students in the sample completed both modules, which would increase their exposure to communication concepts and familiarity. This may have influenced study findings.

5. Conclusion

Given the contagious nature of COVID-19, the use of PPE and telehealth was quickly adopted by nurses to slow the spread of COVID-19 (Asadi et al., 2020; Barrett, 2020), resulting in a paradigm shift in health communication (Fisk et al., 2020) and an urgent need for

effective communication training for nurses to provide comprehensive and empathetic communication to patients and their families during the pandemic (Stevens et al., 2020). To date, there are some COVID-19 provider communication resources (Wittenberg et al., 2021a), yet none of these communication trainings were evaluated for their effects, including communication attitude, knowledge, skill and competency. The *COMFORT COVID-19 Communication Modules* are the first evidence-based communication training tested with nursing students during the pandemic. As nursing education in the United States shifts to competency-based education, study findings presented here provide the first steps for establishing curriculum and competency in communication. The *COMFORT COVID-19 Communication Modules* and *App* provide a foundation for incorporating communication education that is accessible and available to students for free. As an open educational resource with competency-based evaluation methods, it meets the needs of nursing faculty in COVID-19 transformed nursing education.

## Funding

This work was funded by the Archstone Foundation (2020–2021). The funders had no role in the study design, data collection and analysis, decision to publish, or preparation of the manuscript.

## CRediT authorship contribution statement

Confirming that all authors meet the authorship criteria and that all authors are in agreement with the content of the manuscript.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## References

- American Association of Colleges of Nursing, 2021. *The Essentials: Core Competencies for Professional Nursing Education*. American Association of Colleges of Nursing, Washington, DC.
- Asadi, S., Cappa, C.D., Barreda, S., Wexler, A.S., Bouvier, N.M., Ristenpart, W.D., 2020. Efficacy of masks and face coverings in controlling outward aerosol particle emission from expiratory activities. *Sci. Rep.* 10, 15665.
- Back, A.L., Fromme, E.K., Meier, D.E., 2019. Training clinicians with communication skills needed to match medical treatments to patient values. *J. Am. Geriatr. Soc.* 67, S435–S441.
- Barrett, D., 2020. Being Present in New Ways: Nurses, Technology and Covid-19, Being Present in New Ways: Nurses, Technology and Covid-19. *BMJ Blogs*.
- Carmack, H.J., Harville, K.L., 2019. Including communication in the nursing classroom: a content analysis of communication competence and interprofessional communication in nursing fundamentals textbooks. *Health Commun.* 1–10.
- Chen, B., Wang, Y., Xiao, L., Xu, C., Shen, Y., Qin, Q., Li, C., Chen, F., Leng, Y., Yang, T., Sun, Z., 2021. Effects of mobile learning for nursing students in clinical education: a meta-analysis. *Nurse Educ. Today* 97, 104706.
- Choi, H., Lee, U., Jeon, Y.S., Kim, C., 2020. Efficacy of the computer simulation-based, interactive communication education program for nursing students. *Nurse Educ. Today* 91, 104467.
- Fisk, M., Livingstone, A., Pit, S.W., 2020. Telehealth in the context of COVID-19: changing perspectives in Australia, the United Kingdom, and the United States. *J. Med. Internet Res.* 22, e19264.
- Gallegos, C., Nakashima, H., 2018. Mobile devices: a distraction, or a useful tool to engage nursing students? *J. Nurs. Educ.* 57, 170–173.
- George, T.P., DeCristofaro, C., Murphy, P.F., Sims, A., 2017. Student perceptions and acceptance of mobile technology in an undergraduate nursing program. *Healthcare (Basel)* 5.
- N.PAG-N.PAG Ghaddar, S., Vatcheva, K.P., Alvarado, S.G., Mykyta, L., 2020. Understanding the intention to use telehealth services in underserved hispanic border communities: cross-sectional study. *J. Med. Internet Res.* 22.
- Greer, D.B., Hermans, M., Abel, W.M., Njoki, T., 2019. Exploring nursing students' smartphone use in the clinical setting. *Med. Surg. Nurs.* 28, 163–182.
- Haslam, M.B., 2021. What might COVID-19 have taught us about the delivery of nurse education, in a post-COVID-19 world? *Nurse Educ. Today* 97, 104707.
- Hay, B., Carr, P.J., Dawe, L., Clark-Burg, K., 2017. "iM ready to Learn": undergraduate nursing students knowledge, preferences, and practice of Mobile technology and social media. *Comput. Inform. Nurs.* 35, 8–17.
- Kang, K., Lee, M., Cho, H., 2021. Interpersonal skills mediate the relationship between communicative and clinical competencies among nursing students: a descriptive study. *Nurse Educ. Today* 99, 104793.
- Kerr, D., Ostaszewicz, J., Dunning, T., Martin, P., 2020. The effectiveness of training interventions on nurses' communication skills: a systematic review. *Nurse Educ. Today* 89, 104405.
- Kostovich, C.T., D'unya, B.A., Schmidt, L.A., Collins, E.G., 2016. A rasch rating scale analysis of the presence of nursing scale-RN. *J. Appl. Meas.* 17, 476–488.
- Kostovich, C.T., Van Denack, J., Bachmeier, P., 2017. "I will be here for you": nursing students' perceptions of being present for their patients. In: 44th Biennial Convention of Sigma Theta Tau International. Sigma Theta Tau International, Indianapolis, Indiana.
- Lall, P., Rees, R., Law, G.C.Y., Dunleavy, G., Cotic, Z., Car, J., 2019. Influences on the implementation of Mobile learning for medical and nursing education: qualitative systematic review by the digital health education collaboration. *J. Med. Internet Res.* 21, e12895.
- Mancini, M.E., LeFlore, J.L., Ciper, D.J., 2019. Simulation and clinical competency in undergraduate nursing programs: a multisite prospective study. *J. Nurs. Educ.* 58, 561–568.
- McDonald, E.W., Boulton, J.L., Davis, J.L., 2018. E-learning and nursing assessment skills and knowledge - an integrative review. *Nurse Educ. Today* 66, 166–174.
- Ruiz Moral, R., de Leonardo, C.G., Martinez, F.C., Martin, D.M., 2019. Medical students' attitudes toward communication skills learning: comparison between two groups with and without training [Response to letter]. *Adv. Med. Educ. Pract.* 10, 411–412.
- Shorey, S., Ang, E., Ng, E.D., Yap, J., Lau, L.S.T., Chui, C.K., 2020. Communication skills training using virtual reality: a descriptive qualitative study. *Nurse Educ. Today* 94, 104592.
- Skodova, Z., Banovcinova, L., Banovcinova, A., 2018. Attitudes towards communication skills among nursing students and its association with sense of coherence. *Kontakt* 20, e17–e22.
- Stevens, S.K., Brustad, R., Gilbert, L., Houge, B., Milbrandt, T., Munson, K., Packard, J., Werneburg, B., Siddiqui, M.A., 2020. The use of empathic communication during the COVID-19 outbreak. *J. Patient Exp.* 7, 648–652.
- The COMFORT Communication Project, 2021. *Nursing Faculty Resources*.
- The Patient Safety Advisory Group, 2017. Inadequate hand-off communication. September 12. In: Sentinel Event Alert. The Joint Commission.
- Wittenberg, E., Ferrell, B., Goldsmith, J., Ragan, S.L., Buller, H., 2017. COMFORT(SM) communication for oncology nurses: program overview and preliminary evaluation of a nationwide train-the-trainer course. *Patient Educ. Couns.* 101 (3), 467–474. <https://doi.org/10.1016/j.pec.2017.09.012>.
- Wittenberg, E., Goldsmith, J.V., Williams, Y., Lee, A., 2018. Caring for family caregivers: a pilot test of an online COMFORT (SM) communication training module for undergraduate nursing students. *J. Cancer Educ.* 35 (1), 138–143. <https://doi.org/10.1007/s13187-018-1452-3>.
- Wittenberg, E., Goldsmith, J., Ragan, S., Parnell, T.A., 2020. *Communication in Palliative Nursing: The COMFORT Model*. Oxford University Press, New York, NY.
- Wittenberg, E., Goldsmith, J.V., Chen, C., Prince-Paul, M., Johnson, R.R., 2021a. Opportunities to improve COVID-19 provider communication resources: a systematic review. *Patient Educ. Couns.* 104, 438–451.
- E. Wittenberg R.R. Johnson A.R. Tayyeb, 2021b. Utilizing an online communication module with baccalaureate nursing students to teach leadership in team meetings. *Nurs. Educ. Perspect.*
- E. Wittenberg J.V. Goldsmith M. Prince-Paul E. Beltran, In Press. Communication and competencies across undergraduate BSN programs and curricula. *J. Nurs. Educ.*
- Wittenberg-Lyles, E., Goldsmith, J., Ferrell, B., Burchett, M., 2014. Assessment of an interprofessional online curriculum for palliative care communication training. *J. Palliat. Med.* 17, 400–406.