CREATION OF AN EVIDENCE-BASED TELEHEALTH TRAINING MODULE FOR
PRIMARY CARE PROVIDER PRECEPTORS SERVICING VULNERABLE POPULATIONS

by

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This is to certify that

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successfully defended their project entitled:

Creation of an Evidence-Based Telehealth Training Module for Primary Care Provider Preceptors Servicing Vulnerable Populations

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Abstract

**Problem** Despite its potential, telehealth is underutilized in practice, with barriers related to negative provider attitudes. More preceptors are needed that can provide telehealth education and clinical experiences to DNP-FNP students.

**Objective** Increasing the number of providers who deliver telehealth care will allow for increased clinical experiences for DNP-FNP students, and will increase patient access to care. To accomplish this, an evidence-based telehealth training module (TTM) was created for preceptors.

**Background** Telehealth is a disruptive technology that requires a different type of patient care skill set. Nurse practitioners should be ready and able to provide telehealth care, as telehealth is efficacious, cost effective, and can increase access to care. Telehealth education and hands-on experience in most nursing schools is lacking, due to barriers related to full curriculums and faculty that are unfamiliar with telehealth.

**Methods** The Technology Acceptance Model provided a framework for the TTM layout, which focused on increasing perceived usefulness and perceived ease of use, leading to increased positive attitudes towards telehealth. Literature review and training needs analysis via semi-structured interviews with telehealth/community and education/technology experts were utilized to develop course content and learning objectives.

**Results** This DNP project created an evidence-based TTM that educates current providers about telehealth, equipment use and the need for telehealth preceptorship.
Potential Significance This evidence-based TTM can be used to educate preceptors about telehealth use and benefits and has the potential to increase preceptor willingness to use equipment in clinical rotations.

Implications Further, this TTM can be modified to the audience of all nursing students, to provide a short, easy to access instructional module about telehealth.

Keywords: attitude, education, nurse practitioner, telehealth, training
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This project is dedicated to my mother, who has shown me time and again that strength and grace are limitless within us.
**Introduction of Problem**

Family Nurse Practitioners (FNP), those currently practicing and those of the future, need to be ready and able to adopt the most advanced evidence-based patient care as it emerges. Telehealth meets all six domains established by the Institute of Medicine (IOM) as the foundation of quality care; it is safe, timely, effective, efficient, equitable, and patient-centered and it has been recommended for adoption and implementation (IOM, 2001). Telehealth is a disruptive technology that delivers care outside of the traditional healthcare modality and has rapid growth potential (Mehrotra et al, 2017). It is imperative that FNP graduates are early adopters and champions of this delivery modality. The potential impact expanded telehealth care could have on the population’s access to needed services, as well as the trajectory for healthcare services to continue to become more technologically based, create the necessity for the profession to be well versed in telehealth.

**Background and Significance**

Telehealth, broadly defined as the delivery of healthcare via information and computer technologies, has a growing body of research demonstrating at least on-par effectiveness as traditional face-to-face visits (Fraser et al., 2017; Totten et al., 2016) and has the potential to transform healthcare (Rutledge et al., 2017; Schwamm et al., 2017). Telehealth is a viable health care delivery modality (Fraser et al, 2017), is efficacious and cost efficient (Sanyal, Stolee, Juzwishin, & Huseareau, 2018), and is an effective means of providing chronic care education and monitoring to patients (Rush et al., 2018). Telehealth can provide efficient primary care to the population as a whole, possibly even more so for vulnerable populations, such as rural and disabled, who disproportionately lack access to physical and mental health care services (Rush et al., 2018; Fraser et al., 2017).
As a graduate of a FNP-Doctor of Nursing Practice (DNP) program, students are expected to attain and embrace designated Essential Outcomes (American Association of Colleges of Nursing [AACN], 2006). The acquisition of telehealth knowledge and skills meets criteria within each of the eight essential outcomes. Though these essentials were put forth to guide nursing curriculum, they can be considered expectations for the advanced practice profession, making the argument that telehealth education is essential for both students and practicing providers. Essential One requires the DNP to be ready, able and informed to embrace new evidence-based modalities and changes. Essential Two requires the DNP to address social disparities and conceptualize new care delivery models. Essential Three requires the DNP to provide leadership, translate new science and improve practice. Essential Four requires the DNP to be well versed and accepting of information systems and technology, and to use that technology to promote the efficient and efficacious care of individuals and populations. Essential Five requires the DNP to promote social, ethical and equitable care. Essential Six requires the DNP to participate in interprofessional collaboration. Essential Seven requires the DNP to improve population health by promoting prevention and health promoting activities. Essential Eight requires the DNP to acquire and utilize refined assessment skills and techniques across health and social determinants. If telehealth does not directly correlate with an essential outcome, it provides a cost-effective and efficacious way to provide the essential outcome.

In regards to telehealth training for FNP students, full curriculums and inexperienced faculty lead to inadequate integration of telehealth education and experience (Ali, Carlton, Hodson & Omar, 2016). The majority of nursing faculty have not used telehealth application and consider themselves to be at the novice level (Nguyen, Zierler & Nguyen, 2011). Currently, many students graduate from the University at Buffalo (UB) FNP-DNP program, as well as all
other advanced practice programs, without having had any hands-on experience with utilizing telehealth. It is often difficult to secure providers to be responsible for general preceptorship to FNP students; even fewer providers utilize telehealth visits in their practice. Providing exposure to the concept of telehealth without creating an opportunity to practice providing care through such a modality, is likely not enough to make a student feel comfortable with utilizing equipment as a professional practitioner, nor are they likely to remember and embrace the utility of unpracticed skills and mindsets (Standing et al., 2018; Rutledge et al., 2017). The fiscal drivers of the healthcare system will continue to push for adoption of cost-effective treatment methods over time, creating the dilemma that telehealth use will continue to grow, and potentially disrupt traditional care, leaving our profession unable to utilize effective patient care technologies.

Based on society’s growing comfort and dependence on the use of the internet and phones as primary modes of information access and communication, it is likely that many patients will opt over time to complete telehealth visits when able. FNPs that are not exposed to and comfortable with the use of telehealth may not be able to adjust to these healthcare changes, and can ultimately hold back the profession.

Despite its potential, only 15% of family physicians utilize telehealth (Coffman, Moore, Jetty, Klink & Bazemore, 2016). Barriers to telehealth implementation involve cost of equipment, scalability, broadband connectivity, as well as state-by-state variability of reimbursement and licensing requirements (Rutledge et al, 2017). Telehealth is a change not only in product, but also in process; this creates additional human factor barriers related to resistance to change and use of information technology, lack of knowledge and/or confidence (Standing, Standing, McDermott, Gururajan, & Kiani-Mavi, 2018). Telehealth requires a skill set that is different from traditional face-to-face care. Not only does the provider have to create
and maintain a therapeutic and collaborative relationship at a distance, but the provider must also assess and treat without the benefit of in-person observation and impact. Further, the provider must use electronically advanced devices, manage connectivity and potentially collaborate with multiple providers interacting with a patient via video-conferencing. Specialized training is needed to prepare providers to deliver care in this way and it’s not realistic to expect a provider who is not versed in telehealth to effectively teach a FNP student without first attaining the knowledge, skills and attitudes needed to effectively provide telehealth care themselves. In order for students to learn effectively, preceptors must be confident in the use of telehealth (Listar et al., 2018).

This DNP project addressed the need for increased healthcare providers available to be telehealth preceptors to UB FNP students by creating a telehealth training module (TTM) to educate providers on telehealth use and the need for effective clinical experience for students. Trained telehealth providers allow for increased numbers of FNP students to gain clinical experience using telehealth, thereby training our future providers to be knowledgeable, skilled and motivated to adopt proven effective patient care technologies.

**Literature Review**

Literature reviews were completed on CINAHL, PubMed and ERIC databases using keywords related to the topic (telehealth/telemedicine; education; training; providers). The literature was analyzed, with key themes extracted.

In 2016, the Agency for Healthcare Research and Quality (AHRQ) completed an extensive review of the impact of telehealth on patient outcomes (Totten et al., 2016). The AHRQ concluded that there was difficulty summarizing telehealth findings due to the varied research and available telehealth technologies, however there was sufficient evidence found to
recommend the use of telehealth in the care of chronic conditions and psychotherapy. Evidence of efficacy and cost-effectiveness was seen most with the use of telehealth for remote monitoring or communication and counseling, with improvements found in mortality and quality of life and decreased hospital admissions. This indicates that telehealth has widespread use with the engagement, treatment and monitoring of patients with chronic conditions, which encompasses a large facet of our population. Not only is this technology applicable to common patient conditions, it is also effective.

Standing et al. (2018) completed a review of telehealth literature from 2000-2015 and found that telehealth struggles with multiple barriers to implementation related to training. Due to the significant change in care required for telehealth, involving both products and processes, there are significant human elements that hinder growth, notably provider acceptance. Provider acceptance could be impacted with education of the utility and efficacy of the technology, as well as with exposure to the technology, which can increase familiarity and perceived ease of use.

Guise and Wiig (2017) noted that training on telehealth care provision is fundamentally important, as the biggest barrier often seen to implementation of telehealth visits is negative provider attitudes. Negative attitudes are often related to lack of readiness to change, lack of awareness of utility and lack of confidence. Training recommendations include focusing on the usefulness of the technology, the confidence of the user, providing patient-centered care and using effective communication techniques that still create a therapeutic relationship despite the potential distance from the patient (Guise & Wiig, 2017). Training should involve advanced communication, assessment and critical thinking skills. Telehealth education research is still a growing field, with training generally found to be lacking. Adequate training is necessary for
successful implementation and needs to address awareness and confidence to help build motivation within the user to want to learn how to use the equipment (Guise & Wiig, 2017).

A systematic review by Guise, Anderson and Wiig (2014) of patient safety with telehealth found there is a need to better identify and describe patient safety risks due to insufficient literature. Current literature most commonly noted risks to patient safety related to the change in the nature of the clinical work, lack of patient and/or staff knowledge and technology issues. Further, motivation can be compromised by lack of understanding resulting in compliance and adherence concerns. Use of telehealth requires new ways of working and can be experienced as a threat to the traditional ways of patient care. Adequate user support is critical for safe and reliable healthcare via telehealth. There is a significant lack of practice standards and guidelines. Education is fundamental to ensure the skills, confidence and motivation needed to provide safe care via telehealth, however patient safety is often a forgotten topic in telehealth nursing curriculum. Training should increase awareness of potential patient safety risks and promote new ways to engage with the patient from a distance (Guise, Anderson & Wiig, 2014).

In a survey of 43 schools of nursing, Ali, Carlton, Hodson & Omar (2015) found that there was “inadequate integration of telehealth in classroom content, simulation and clinical experiences” (p. 266), with barriers including full curriculums, lack of time to learn telehealth delivery, overworked faculty and cost of equipment. Nursing programs should prepare students to feel confident using telehealth technologies, however currently many faculty have not yet embraced the importance of adequately preparing and exposing nursing students to telehealth (Ali et al., 2015).
Rutledge et al. (2017) completed a literature review of telehealth training for nurse practitioners (NP) and NP students, with minimal literature found that focused on telehealth education. From the available telehealth literature, Rutledge et al. (2017) recommend a multimodal training framework that includes didactic, simulation with standardized patients, clinical rotations and telehealth projects to build student comfort, knowledge and skills (see Appendix A). Foundational topics include defining telehealth, telehealth etiquette, interprofessional collaboration, reimbursement, security/privacy, ethical practice, and satisfaction.

Regarding recommended modalities of telehealth training, Rutledge et al. (2017) acknowledge that didactic content is useful for providing knowledge of telehealth, however it alone is not effective to address skill development and comfort with the modality. Experiential learning, such as simulation and clinical experience, is necessary to overcome resistance to using telehealth. Rutledge et al. (2017) found that students who participated in telehealth simulation developed comfort using the equipment and realized that it was possible to build a therapeutic relationship via telehealth. A simulation experience allows the student to practice and develop confidence, prior to expecting the student to jump into use at a clinical experience.

It is important for NPs to be accepting of telehealth, as they are often the primary care providers for rural and underserved populations - the populations most likely to benefit from telehealth’s ability to increase access to care (Rutledge et al., 2017). Therefore, it is vital for NPs to have the knowledge, skills and attitudes to promote and encourage telehealth use. Many nursing programs struggle to provide telehealth simulation and clinical experiences to students, due to lack of knowledgeable/willing faculty and lack of equipment (Rutledge et al., 2017).
The National Organization of Nurse Practitioner Faculties (NONPF, 2018) released a position statement asserting that telehealth can effectively be used to address the healthcare provider shortage, increase access to care, and allow for management of our growing, aging and increasingly complex patient population. Due to the significant impact that telehealth affords, future NP professionals should be successful telehealth practitioners. The position statement officially recommended the addition of telehealth to nationwide NP curriculum, and recommended the previously noted multimodal framework developed by Rutledge et al. (2017).

The NONPF (2018) established telehealth educational competencies to guide curriculum development. The competencies include etiquette and professionalism during videoconferencing; proficiency in using peripheral devices, such as otoscope, dermascope, etc.; understanding when telehealth should and should not be used; understanding of privacy regulations and maintenance; knowledge of appropriate documentation and billing for telehealth; ability to collaborate interprofessionally using telehealth; and proficiency in obtaining health history, performing physical examination and generation of appropriate differential diagnoses using telehealth (NONPF, 2018). The position statement also recommended that telehealth be utilized for increased observation of students during clinical encounters. With the ability to remotely view the student, it is possible to increase the frequency in which the student is observed providing care, instead of the regular site visit (NONPF, 2018).

The NONPF (2018) encourages the addition of telehealth into NP curriculum and believes that telehealth should be incorporated into clinical experiences and oversight. The expectation is that NP schools will incorporate the multimodal telehealth curriculum that enables students to achieve the outlined educational competencies. It makes sense that any professional NP is a better provider to also attain this knowledge and competency. If telehealth achieves its
full potential and is widely adopted throughout all levels of healthcare, it will be imperative for NPs to be able to effectively navigate these technologies and relationships. At a minimum, any NP that is providing telehealth preceptorship should be knowledgeable and competent in telehealth.

Justification for this DNP project is found in the Health Resources and Services Administration (HRSA) grant that provides the funding that has allowed the UB School of Nursing to have access to telehealth equipment. With the assistance of the HRSA grant, the UB School of Nursing has access to telehealth equipment and faculty that value the opportunities that telehealth presents to our profession and our patients. The telehealth grant is focused on implementing telehealth care to underserved populations. An objective of the grant focuses on increasing the preceptor pool to facilitate advanced practice nurse training (Austin-Ketch, 2016). This grant focuses on four primary care sites that service vulnerable populations, including Native Americans (NA) and patients with developmental disabilities.

The needs assessment completed by Austin-Ketch (2016) for securement of the HRSA grant found that students are inexperienced with telehealth care, but are interested to learn and acknowledge the potential value. Previous DNP projects and focus groups have found that local NA patients perceive telehealth as valuable in improving engagement and access to care. Patients also valued cultural competence, integration of primary care and behavioral services, and expressed concerns about chronic health conditions and behavioral concerns that could be addressed with counseling (Austin-Ketch, 2016). As previously noted, the AHRQ confirmed that telehealth has been found to be effective in the counseling of chronic conditions, including behavioral health concerns (Totten et al., 2016). This expressed need and evidence-based intervention further reinforce why it is prudent to increase the use of telehealth, and therefore
increase the providers’ knowledge and experience with telehealth. This will not only address the
needs of the population, but it will allow for students to participate in clinical experiences that
allow for direct telehealth training. As discussed above, hands-on telehealth is essential for the
effective acquisition of telehealth advanced practice skills (Rutledge et al., 2017). Creating
better prepared current and future providers will also positively impact the well-documented
need for primary care providers, especially in rural and low-income Medicaid populations.
These populations have high potential impact from increased telehealth implementation, due to
telehealth’s inherent ability to increase access to otherwise unavailable care and linkages (Rush
et al., 2018; Fraser et al., 2017).

Conceptual Framework

The Technology Acceptance Model (TAM) (see Appendix B) was used as a conceptual
framework for this DNP project, due to the need to create a TTM that creates excitement and
acceptance for the use of a new technology, and its eventual relay to students via preceptorship.
In the TAM model, a user’s intent to utilize a technology is based on the perceived usefulness
and the perceived ease of use of the technology (Kim, Lee, Hwang & Yoo, 2016; Davis, Bagozzi
& Warshaw, 1989). Using this framework, if the provider receives education that shows the
benefits and widespread uses of telehealth, perceived usefulness of the technology will increase.
If the provider’s knowledge of and confidence in the use of the telehealth equipment is increased,
the perceived ease of use of the technology will increase. According to the TAM, increasing
perceived usefulness and ease of use will lead to increased behavioral intention to use and
ultimately actual use. Behavioral intention to use can be considered attitude and/or motivation to
use telehealth. This model is useful to demonstrate the human factors related to behavioral
intentions, which impact acceptance and use of telehealth. It is important for the provider to
believe in telehealth, especially if they will be shaping the educational experience with telehealth for a FNP student. The TTM focused on improving the viewer’s opinion of telehealth as beneficial to providers and patients, as well as the viewer’s opinion that telehealth is easy to use. According to the TAM framework, this improves the viewer’s attitude towards telehealth and increases the viewer’s willingness to use telehealth. This information was provided in the context of precepting FNP students in telehealth, demonstrating benefits of precepting and ease of doing so – again, according to TAM framework, this increases the viewer’s attitude/motivation towards precepting FNP students using telehealth.

The expectation is that this TTM will be used to assist in the education of providers to use the available telehealth equipment. That is not to say that the viewing of this video will allow the provider to independently use the telehealth equipment without any further instruction or assistance. Instead, this TTM will be a foundation and first impression of telehealth and its uses, benefits and implications for the profession. The TTM is specifically focused on increasing confidence in ability, increasing motivation to use the telehealth equipment, and increasing desire to precept NP students with telehealth care. TTM content will consist of the didactic component of the multimodal framework laid out by Rutledge et al. (2017) and will aim to address the competencies laid out by NONPF (2018).

Aside from the education of the providers, utilizing the Rutledge et al. (2018) multimodal framework and combining this with the variables laid out in the TAM model, one can envision a telehealth course that can be developed for the UB School of Nursing. As previously noted, most schools of nursing are under-preparing graduates for patient care involving telehealth. The TTM can be a first step to assess student interest and engagement in telehealth concepts, while also educating students on the uses, easy operation and benefits of telehealth. Further, much of
the literature discusses the importance of utilizing interprofessional collaboration with telehealth education, as providers will often be working across professions, using telehealth communication for improved patient care. The fully developed telehealth content could be offered in an elective one-credit course that is open to all health profession students that express an interest in telehealth experience. The course would be developed from the multimodal telehealth framework, with the conceptual framework of the TAM model employed to design course objectives and relay of content.

**Methodology**

Telehealth and educational technology expert interviews and literature review were used to create an evidence-based TTM to teach providers how to provide safe, effective and patient-centered care using an emerging and currently under-utilized patient care technology. The literature demonstrated that telehealth education should be multi-faceted, with the need to educate on the usefulness of the technology in regards to improving patient care and access. Further, it was integral to develop confidence within the user, in order to overcome the resistance to change that naturally exists in people, especially with telehealth’s changes in both process and content related to patient care. To achieve this, a TTM must engage the user, put them at ease, and help them to see that telehealth is a positive and needed skill to have. The main goals of the TTM were to increase user interest and confidence in ability to implement telehealth.

According to Guise & Wiig (2017), it is imperative to complete a training needs analysis when developing telehealth education. Further, telehealth training should include community involvement and culture competency (Fraser et al., 2017). Semi-structured interviews were used to complete a training needs analysis for the TTM. Information obtained from the training needs
analyses were used to establish training objectives, intended learning outcomes, and course content (Guise & Wiig, 2017).

Expert opinion related to telehealth care, as well as the care of vulnerable populations, was elicited from a community content expert who has multiple years of experience providing telehealth care to vulnerable populations. The community content expert played an integral role in the needs assessment and acquisition of the HRSA grant that provided the telehealth equipment currently in use. Further, the community content expert has worked with the NA population for many years and has built a trusting relationship with the patients, as well as the community at large. A semi-structured interview was completed with the community content expert to obtain qualitative data feedback on what content was required for adequate TTM content. At the beginning of the interview, community content expert was presented with the use of the TTM to educate current providers, with the TAM model as the conceptual framework. Educational content suggested by Rutledge et al. (2017) to be presented in the didactic content of the TTM was provided briefly, to ensure that community content expert is aware of the overall TTM focus of improving confidence and intent to use. Questions for community content expert were be focused on telehealth must know information, especially with relevance to the populations and cultures at hand. Interview was limited to 60 minutes and was recorded, to ensure that key themes and education needs were accurately extracted. Recommended content was incorporated into TTM draft.

Expert opinion was also collected from an educational technology expert, who was provided similar information as community content expert including proposed TTM uses and conceptual and multimodal frameworks for telehealth education. Educational technology expert
interview content was focused on the format and layout of the TTM. A semi-structured interview was limited to 60 minutes, with qualitative data recorded and analyzed.

For both expert opinion interviews, a proposed layout of a 20-30 minute TTM, broken down into separate modules was discussed, with amendment as suggested by experts. Qualitative feedback received from the experts guided the development of the content, layout and mechanism of delivery of the TTM. After the TTM content was developed, the experts reviewed the TTM in full and provided additional qualitative feedback. Specifically, the experts assessed whether or not the TTM was adequate based on area of expertise. Experts provided written feedback, with suggestions for improvement incorporated into TTM.

Further review of content was completed by previous FNP graduates who previously completed telehealth clinical experiences and submitted successful DNP projects related to telehealth or the vulnerable populations cared for at the relevant sites. Brief semi-structured interviews were completed via phone with each FNP graduate, to obtain qualitative feedback about whether TTM successfully addressed areas of user confidence, telehealth efficacy and use potential. Again, these areas relate back to the TAM model variables, with the goal that increased confidence and knowledge of telehealth efficacy engages the user and increases the likelihood of successful telehealth buy in. Qualitative feedback obtained from the FNP graduates was incorporated into TTM content revision.

**Ethical Considerations**

There are minimal ethical concerns related to this DNP project, as no patients were involved in the development or viewing of the TTM, therefore there was no risk of privacy violation or patient harm. Experts used to develop course content participated by their own free will and there was minimal risk related to interview and viewing of TTM material. UB FNP
Alumni that view the TTM had minimal risk of harm, as they were only expected to watch the content and provide feedback. If the next portion of telehealth training, in-person hands on training, is completed prior to completion of DNP project, the provider’s risk remains minimal, as the training will take place in person and at the provider’s place of employment, ideally in a lunch-and-learn type of setting. The provider will have a telehealth resource person present to assist with set up and answer any and all questions. There is significant potential benefit for the providers and patients within the serviced communities, as providers who are trained in and feel comfortable implementing telehealth can use the equipment to connect patients to providers who would otherwise be out of reach for the patient. This DNP project has the potential to improve current and future provider awareness and use of telehealth as a healthcare delivery modality, while increasing access to care for patients who may currently be unable to link with needed healthcare.

Results

The creation of the TTM layout and content was guided by the findings from the literature review, as well as expert interview. The results of the literature review demonstrated that there were multiple barriers related to telehealth training, with a commonly noted barrier of negative provider attitudes (Standing et al., 2018; Guise and Wiig, 2017). Standing et al. (2018) and Guise and Wiig (2017) noted that provider acceptance of telehealth could be improved with exposure and education, which coincides with the variables of the Technology Acceptance Model, used as a foundation for the TTM. The TTM focused on explaining the usefulness of technology and building the confidence of the user; both were training recommendations provided by Guise and Wiig (2017). Providing adequate user support was worked into the TTM, as recommended by Guise, Anderson and Wiig (2014). Rutledge et al. (2017) noted the
importance of building comfort, knowledge and skills among the user and this was the primary focus of the TTM. Rutledge et al. (2017) also noted that hands on experience with telehealth equipment and use is essential, meaning that the TTM alone would not be sufficient to building the user’s confidence enough to overcome the resistance to change. The TTM was therefore created as the first step in the exposing the preceptor to the equipment and general concept of telehealth. After viewing the TTM, if the user is interested in becoming a telehealth preceptor, it is made clear that additional hands on training will be provided, and that technology support will be available during all clinical experiences. This ensures that the recommendation to provide hands on training and ongoing support are implemented (Rutledge et al., 2017).

The TTM focused on improving the user’s opinion of telehealth as beneficial to providers and patients, as well as the user’s opinion that telehealth is easy to use. According to the TAM framework, this improves the user’s attitude towards telehealth and increases the user’s willingness to use telehealth (Kim, Lee, Hwang & Yoo, 2016; Davis, Bagozzi & Warshaw, 1989). This information was provided in the context of precepting FNP students in telehealth, demonstrating benefits of precepting and ease of doing so – again, according to TAM framework, this increases the user’s attitude/motivation towards precepting FNP students using telehealth.

This capstone project has multiples types of results, all of which are summarized below. Findings from expert interviews were combined with telehealth training recommendations obtained from the literature review to create the content and layout of the TTM. The TTM itself is another result, and will be described. After completion of the initial TTM, three recent alumni who completed capstones about telehealth through the School of Nursing, reviewed the TTM on UBlearns. Semi-structured follow up interviews were then completed with each alumnus
independently, with TTM feedback and recommendations provided. The TTM was also viewed by faculty who are familiar with the telehealth program, including the technology expert that was interviewed, with TTM feedback and recommendations provided. The combined feedback from the alumni and the faculty were then utilized to guide final revisions to the TTM. Results are broken down below.

Results: Expert Interviews

The results of two expert interviews are provided below, with the question asked and the summary of the expert. Each interview was audio recorded, allowing for repeat listening. Each interview was listened to two times, with themes summarized from the interviews and provided back to each expert in written form, to allow for validation, which was provided by both experts. According to Birt, Scott, Cavers, Campbell and Walter (2016), this validation from respondents helps to ensure accuracy.

Expert Interview #1: Technology Expert

1. Do you have any recommendations on how to engage adult learners in online format?
   
   - Keep each module short – 8-10 minute videos at most, due to buffering time and attention span of the user
   - Recommended module topics: Introduction/Goals; Equipment Usage (peripheral devices); Telehealth Uses

2. What are common issues or complaints regarding online educational content?
   
   - Issues regarding understanding technology in general and UBlearns specifically. Even younger students have trouble navigating technology. Organization of material within UBlearns is key. Use of Firefox and Google Chrome is recommended.
3. Do you have any recommendations regarding use of UBlearns to deliver educational content?
   - Similar recommendations to above questions. Based on accessibility guidelines, a script for all content must be provided, to allow for students with individual needs to be able to utilize information.

4. Are there specific video programs that work well with UBlearns? Are there ones to avoid?
   - Screencast-o-matic was the best fit video program, based on prior use of program with the nursing program. Screencast-o-matic puts videos into mp4 format and has an automatic time cutoff, which will help to keep content short. Videos can then be added into UBlearns module content.

The technology expert also provided a demonstration of how to build content within the UBlearns online environment, where the TTM would be built and accessed.

Expert Interview #2: Telehealth and Cultural Expert

1. In your experience, what are the main barriers that you have experienced using telehealth? What are the main barriers voiced by colleagues?
   - Patient trust – reviewed that Global Med TES is HIPAA compliant, with all data wiped clean after each use.
   - Technology issues – IT technology team/support needed for satellite/internet/data issues. Discussed early roll out of Telehealth, which had issues related to a lack of local people available to assist with IT issues (Global Med Headquarters is in a different time zone). Also discussed early issues with inadequate bandwidth. Many of these issues have been resolved as the program has continued.
   - Communication with clinic space and staff
• Colleagues perceive telehealth as futuristic, have different opinions on usefulness and perceive it as too hard to adjust to.

2. What was the hardest thing to learn when you began using telehealth?

• Hardest adjustment came when first started using. Initially began in telemedicine, which consisted of providing advice over the phone or computer. There was no use of peripheral devices, so it was difficult to fully assess patient symptoms. It felt like it didn’t fully meet the needs of the patient and lacked personal connection. Moving into telehealth, which involved the use of peripheral devices, allowed for more robust encounter. Also allowed for real time ability to fill medications, etc. Patients have consistently expressed high patient satisfaction for telehealth use, with technology issues the only complaint.

3. Do you think that vulnerable populations experience telehealth in different ways than the general population? If so, do you have recommendations to address?

• Cultural difference are important to be aware of. Native Americans tend to be fearful/mistrusting of the government, Big Brother and technology in general. Also among the homeless population, there is a lack of trust and less acceptance.

4. How did you learn how to use telehealth equipment? If you had the chance to have training, what would be your recommendations as what would have been useful for you starting off?

• Had access to Global Med tutorials and a hands on trainer that came to provide teaching. UB was a beta site of early adopters, which allowed Global Med to provide education and learn from UB user experience.
- Most important training content for telehealth users would be troubleshooting. For new faulty or users of telehealth, education on the basic functions is most important.

Results: TTM Content

The TTM is accessed via UBlearns, with interested preceptors provided log in information for the website. The TTM takes 25-30 minutes for full completion and the user is able to access the information as many times as desired. The TTM has a table of contents that the user is able to see upon initially clicking on the link “Telehealth Training Module”. The table of contents lists the five steps of the TTM and helps to guide the user on how to navigate the information. Based on literature review and expert opinion, the navigation of the TTM needs to be easy to understand and navigation-friendly, so this was a focus during TTM development. It was also important to ensure that all components of the TTM could be quickly viewed and downloaded, as noted by the technology expert. Recommended video programs and video lengths were utilized, to ensure that buffering or lengthy download times would not disengage or overwhelm the user.

Step 1 is titled “PowerPoint #1”, and provides the user with the goals and layout of the TTM. The focus of this voice-over PowerPoint is to engage the user, provide evidence of the usefulness of telehealth and the ease of use of the equipment. Both of these areas address the key components of the TAM framework for increasing motivation and intent to use technology. The PowerPoint also provides a pictorial and audio review of each component of the telehealth equipment and its set up, with a focus on the ease of use.

Step 2 is titled “Step-by-Step Telehealth Set Up Guide” and is a one page printable document that provides step-by-step instructions on the telehealth equipment set up. The user is able to, and encouraged to, print this document out for reference.
Step 3 is titled “Telehealth Demonstration Video” and provides a 6-minute video showing the step-by-step set up of the telehealth equipment. This set up provides a visual example of the one page printable document the user obtained in Step 2, as well as the information provided in the Step 1 voiceover PowerPoint. The goal of this video is to increase the user’s confidence in ability to successfully set up and use the equipment. Showing the user that the equipment is set up in 6 minutes helps to make the equipment feel less daunting, again addressing the barriers noted in the literature review. Building the confidence of the user is essential, according to the TAM framework, and Steps 2 and 3 provide easily accessible ways for the user to engage with telehealth set up.

Step 4 is titled “PowerPoint #2”, and provides the user with information about the under-utilization of telehealth in healthcare and in nursing curriculum. The voiceover PowerPoint then makes a direct pitch to the user to take the next step to become a telehealth preceptor and provides next steps in how to do so if interested.

Step 5 is titled “Brief Survey” and consists of four Likert scale questions, a yes/no question regarding interest in becoming a telehealth preceptor and a narrative section to provide any feedback regarding the TTM content and recommendations for improvement. The Likert scale questions focus on the main variables of the TAM framework, usability and confidence, and allow for tracking and possible statistical analysis of TTM effectiveness in impacting these variables.

The TTM table of contents has a supplemental folder titled “Telehealth Useful Resources” and includes general telehealth information, New York state specific telehealth laws and reimbursement, as well as the recommended telehealth training model provided by Rutledge et al. (2017).
Results: TTM Feedback and Recommendations

The TTM content was reviewed by two UB School of Nursing faculty familiar with telehealth, one of whom was interviewed prior as the technology expert. General formatting, grammar and spelling corrections were provided for each TTM component, with recommended changes incorporated into the TTM prior to alumni review.

Semi-structured phone interviews were completed with three alumni. The following questions were asked to each alum:

1. How is the overall ease of navigation of the module itself?
2. Does the material help the user to understand telehealth and its benefits?
3. Does the material help the user to feel more confident in using the equipment?
4. With your background in telehealth use, do you feel the material is accurate?
5. Is there anything that you feel should be added or deleted?

Regarding the overall ease of use and navigation of the module, all alumni reported the TTM to be user friendly and easy to understand. Alumni reported that the TTM helped the user to understand telehealth and its benefits. Some alumni recommended further expansion on the diversity of telehealth applications, such as patient monitoring and student precepting, to help clarify the role of telehealth at the UB School of Nursing. Other recommendations included expanding on the potential benefits for the preceptor to become more diversified for their own clinical practice and their profession. Alumni reported that the TTM provided explanation of common issues and how to troubleshoot. It was recommended to provide more information about the accessibility of UB IT staff for any connection or equipment issues, as well as additional pictures and description of the software program (eNcounter) used. It was also
recommended to include information about the telehealth equipment case, specifically its weight, wheels and waterproof exterior.

Regarding user confidence, all alumni reported that the voiceover PowerPoint, one page set-up guide, and 6-minute video helped to take away the daunting nature of telehealth equipment set-up. Alumni reported that the TTM content helps the user to feel more confident regarding the independent set up of the equipment. Alumni stated that users who were interested in becoming telehealth preceptors would be better prepared and able to absorb future in-person training on the equipment. It was also recommended to provide a visual depiction of how the telehealth equipment would be utilized during preceptorship, showing the student in the exam room with the patient and TES unit, the preceptor’s physical location away from the student and the availability of UB IT support staff.

**Discussion**

The TTM is the first telehealth training module of its kind for the UB School of Nursing. This capstone project is partial fulfillment to a grant objective in the HRSA ANEW grant, in that it provides a means to increase the number of preceptors available to provide telehealth preceptorship (Austin-Ketch, 2016). The creation of this TTM utilized evidence-based techniques, expert feedback and telehealth alumni review to ensure its accuracy, usefulness and user engagement.

This TTM can be offered to providers at the multiple sites covered within the ANEW grant, which would not only increase preceptorship opportunity and student clinical experience, but also increase patients’ exposures to and uses of telehealth. The TTM content is broad enough that it can also be offered to providers at all other healthcare sites, again increasing preceptor availability, student clinical experience, patient exposure, as well as overall telehealth
exposure to the general healthcare population. The TTM is a useful teaching tool for faculty, preceptors, potential preceptors and students, in that it provides basic information about telehealth, as well as basic operation of UB’s telehealth equipment. This supplements current telehealth education available for faculty, preceptors and students. The survey that is part of the TTM allows for statistical tracking of user feedback and outcomes.

This capstone project created a short, easy to access, telehealth education material that has widespread application possibilities for faculty, preceptors and students alike. The TTM provides the opportunity for the UB School of Nursing to expand its current education and clinical practice of telehealth, which is in agreement with the Nurse Practitioner Faculty Association recommendations (NONPF, 2018). As noted, telehealth education curriculum is underutilized in current nursing programs across country, often with barriers related to lack of time to teach and faculty inexperience (Rutledge et al., 2017; Ali et al, 2015; Nguyen, Zierler & Nguyen, 2011). The concise, web-based nature of the TTM can be easily added to current nursing curriculum and can be used as a training tool prior to hands on telehealth education. The TTM is designed in a way to increase the user’s knowledge of and confidence in using telehealth, in an effort to reduce the human factor barriers related to resistance to change (Standing et al., 2018). Being at the forefront of telehealth nursing curriculum expansion further demonstrates UB School of Nursing’s commitment to evidence-based and progressive nursing education.

Though the current TTM is geared towards preceptors, the TTM can easily be focused to nursing students, both undergraduate and graduate, with slight changes in the TTM content. Providing students with the TTM prior to hands on training with the telehealth equipment will likely help to decrease anxiety and therefore increase learning and retention potential (Rutledge
Further, the TTM content can also help to increase student motivation to learn about telehealth and its various applications, increasing student engagement with the learning process. Increased exposure to telehealth education and use during schooling will only help to increase future professionals’ ability and desire to utilize telehealth in clinical practice. With only 15% of family physicians utilizing telehealth (Coffman, Moore, Jetty, Klink & Bazemore, 2016), it is imperative that healthcare providers are ready and able to accept telehealth. Not doing so will likely put these providers at a competitive disadvantage and reduce the overall impact of telehealth technology.

Over time, the compilation of the TTM survey feedback can provide a data set to track the main variables of the TAM used in the framework, usefulness and user confidence. As noted in the literature review, there is lacking telehealth education research regarding how best to teach our profession and its future leaders, about telehealth and its adoption in the health care system (Rutledge et al., 2017; Nguyen, Zierler & Nguyen, 2011). This quantifiable feedback can allow for future analysis and revision of the TTM, as well as determine whether the TAM framework utilized in the creation of the TTM was successful in increasing user intention to want to become a preceptor or to use telehealth equipment. This allows for analysis of the TTM in its current form, and also allows for future capstone projects to analyze and augment TTM content and application.

**Strengths**

The TTM addresses many of the DNP Essential Outcomes discussed earlier in the paper (AACN, 2006). The increased use of telehealth within our healthcare systems creates a cost effective means to address social disparities and conceptualize new care delivery models, including new information technology systems. By creating more preceptors who are exposed to
the use the telehealth, there is more opportunity for FNP students to gain clinical exposure to its uses. The opportunity for FNP students to become comfortable with the concept of care at a distance greatly increases their professional capabilities of embracing these technologies in their careers. Doing so creates greater numbers of FNPs who are able and willing to be at the forefront of this expanding technology. This TTM allows for preceptors to learn about and embrace the transformative power of telehealth technology and in doing so embraces the AACN Essential Outcomes.

The TTM successfully provides users with an efficient and easily accessible method to learn about the overall concept of telehealth broadly and the operation of the UB School of Nursing telehealth equipment specifically. The TTM was created using evidence based content obtained via literature review, as well as expert recommendations from both telehealth and technology experts. The TTM content was created with the conceptual framework of the TAM, increasing the likelihood that the behavioral intention of the user will be successfully influenced to embrace telehealth preceptorship.

The TTM is generalized enough to successfully engage any potential preceptor, regardless of practice setting. There is minimal time commitment required to review the TTM and the materials can be viewed multiple times, with relevant written materials and guides available for printing. The TTM focuses on basic information about equipment operation, so as not to overwhelm or disengage the user.

The TTM provides a strong foundation to begin user engagement in the telehealth preceptor process and can be easily augmented to include more in-depth and advanced telehealth operation material. The step-by-step set up of the TTM allows for supplementation with
additional content as needed, always allowing the user to return to previous, more basic steps, or view more advanced steps multiple times.

The survey provided at the end allows for the obtainment of user feedback regarding changes in knowledge, confidence and interest in becoming a telehealth preceptor. The collection of user feedback over time, serves multiple functions. First, it allows for users to describe what areas of the TTM need further clarification or detail, as well as provide general feedback on the overall TTM set up and ease of use/accessibility. Any areas of recommendation can then be revised or updated to reflect user feedback. Second, the survey asks the user to rate their perceived level of confidence in using telehealth equipment and their perception of the overall usefulness of telehealth. These questions tie back to the variables within the Technology Acceptance Model. The ability to calculate overall changes in these variables across a large number of TTM viewers allows for the determination of the success of the TTM to address confidence and usefulness. Over time, the collection of data of these two variables, compared with the user’s final decision on whether or not they are interested in becoming a telehealth preceptor allow for possible correlation of data regarding TTM content viewing and change in behavioral intention to use telehealth.

Finally, the current TTM content focuses on engaging potential preceptors, however the material can be easily augmented to be focused on nursing students, both undergraduate and graduate. With the location of the TTM content within the UBlearns educational environment, it would be very easy to add this revised TTM content to the curriculum of current School of Nursing courses. This additional would greatly increase the student body’s access to information about the applications and operation of telehealth. Currently educational content includes some hands on practice with the current UB telehealth equipment. This TTM content could be
provided to students first, to allow them to visualize telehealth equipment use and set up prior to the class training, likely increasing student engagement and knowledge retention. Further, the TTM content sets the stage for the student, in that it provides a basis for why telehealth is important and why it is imperative for the nursing profession to be at the forefront of such technology.

**Limitations**

The primary limitation of the TTM is that it does not allow the user to practice using the telehealth equipment, which Rutledge et al. (2017) acknowledge is essential for telehealth education and training. The TTM provides basic information to engage the user, as well as basic operation instructions, however it is clearly stated in the TTM that if the user is interested in becoming a telehealth preceptor, additional in person training will be provided. Another limitation involves the specificity of some of the TTM training content. The basic knowledge provided regarding telehealth efficacy, applications and lack of presence within nursing school education curricula is generalizable to all telehealth; however, the training video and set up instructions are specific to the current telehealth equipment that the UB School of Nursing is currently using. If the equipment is upgraded, the TTM content will have to be supplemented. Lastly, the TTM content is limited by time constraints and need for basic information that is specifically focused on not overwhelming the user.

**Contributions**

The creation of this TTM for the UB School of Nursing provides a framework for telehealth engagement and education for potential preceptors. Increasing the number of preceptors who are able and/or willing to utilize telehealth equipment in clinical settings provides more opportunities for FNP students to gain experience with using telehealth equipment.
in patient care settings. Increasing exposure of FNP students to telehealth patient care pushes the profession forward, in that these students can go on to become FNPs in practice who understand the worth and breadth of telehealth patient care opportunities. The use of TTM also allows for preceptors to become more aware of the importance of telehealth, potentially increasing their desire/ability to use telehealth in the future.

The TTM can be supplemented to include nursing students, both undergraduate and graduate. Doing so would allow for every UB School of Nursing student to become familiar with the uses of telehealth and the operation of the telehealth equipment, augmenting current UB School of Nursing telehealth curriculum. Expanding the telehealth education provided to nursing students helps to ensure that the nursing professionals leaving UB School of Nursing will be ready and able to be at the forefront of telehealth adoption and implementation. As noted in the literature review for this project, most nursing school curriculums fall short in providing adequate telehealth education and exposure. The adoption of this TTM goes a long way in filling the telehealth curriculum gap.

Since the literature clearly demonstrates that hands-on experience with telehealth equipment is required to build user confidence, the TTM will have to be supplemented with hands-on training. Though the TTM cannot replace this, the TTM material will help the user to understand the usefulness of telehealth, as well as the need for FNP students to be precepted in telehealth to allow our profession to continue to grow. Ideally, the providers will view the TTM module, which will have the ability to have the user complete one or multiple short quizzes at the end of each module, to allow for feedback. More simply, confidence and intent to use numeric rulers can be employed before and after training, to assess for user engagement. Feedback can then be provided related to possible barriers to telehealth preceptorship, to allow for
incorporation into preceptorship preparation. This TTM can also be slightly modified to the intended audience of students, allowing each student in the FNP program to view a 20 minute module on telehealth use related to patient care and our profession. This will increase the current exposure that students have to telehealth. Further, the students can complete similar confidence/intent to use rulers at the end and provide feedback on TTM content. Additionally, students can be asked via survey question if they are interested in taking a one credit, elective course on telehealth. If there is an interest, the full multimodal framework by Rutledge et al. (2017) can be used to create such a course, with the possibility of creating simulation experiences, clinical rotations, etc. Again, this course could also allow for interprofessional collaboration, if other schools of pharmacy, medicine or social work were interested in presenting TTM material to their students as well. As a whole, this would help to better prepare UB students of healthcare professions to embrace and implement telehealth in their careers.

**Conclusion**

The creation of this TTM is a substantial step forward in the telehealth education provided by the UB School of Nursing. Not only does this TTM provide telehealth knowledge and operation, it is provided in an accessible way that is geared towards increasing the number of preceptors that are agreeable to allowing students to practice with telehealth equipment in their practice setting. Telehealth is a fast growing and effective means of patient care. It is imperative for nursing professionals to be prepared to embrace this technological leap in patient care. Nursing professionals who are aware of the efficacy of telehealth and who also feel confident to provide patient care in this new type of patient care setting will ensure that patients have access to receiving this beneficial and cost effective form of healthcare.
References


Austin-Ketch, T. (2016) SUNY high needs grant: Telehealth for FNP DNP students. [Unpublished grant narrative]. State University of New York, University at Buffalo, Buffalo, NY.


Appendix A

Multimodal Framework to Telehealth Education

*Figure A1* A visual description of the multimodal telehealth education framework. Adapted from “Telehealth and eHealth in nurse practitioner training: current perspectives,” by Rutledge et al. 2017, *Advances in Medical Education and Practice*, 8, 399-409. Used with permission
Appendix B

Technology Acceptance Model (TAM)

![Diagram of the Technology Acceptance Model (TAM)]

*Figure B1* A visual description of the technology acceptance model (TAM). Adapted from “User acceptance of computer technology: A comparison of two theoretical models,” by F.D. Davis, R.P. Bagozzi, & P.R. Warshaw, 1989, *Management Science, 35*(8), 982-1003. Used with permission