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## Telehealth Student Experiences and Learning: A Scoping Review

Katrina M. Serwe  
*Concordia University*

Makayla Heindel  
*Concordia University*

Isabel Keultjes  
*Concordia University*

Hailey Silvers  
*Concordia University*

Samantha Stovich  
*Concordia University*

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## Telehealth Student Experiences and Learning: A Scoping Review

### Abstract

Telehealth as a service delivery model is increasing in popularity. Knowledge and use of telehealth technology will be a new mandatory learning outcome in occupational therapy curriculums with the implementation of the 2018 Accreditation Council for Occupational Therapy Education standards. However, it is not known how healthcare programs are currently incorporating telehealth into education or which methods of telehealth education are most effective. This study addressed this gap in the literature using Arksey and O'Malley's five-step methodological process to conduct a scoping review to examine the student experience of delivering healthcare services via telehealth and related learning outcomes. The scoping review encompassed eight databases with inclusion criteria of articles that discussed student learning outcomes, telehealth or telemedicine, and the student experience of delivering telehealth services. The research team screened 955 articles, reviewed 24 full-text articles, and came to a consensus on six articles to include in the review. Findings suggested a high level of student satisfaction related to the experience of delivering healthcare services using telehealth. Results indicated that students have a variety of related learning outcomes including increased knowledge of their professional practice, increased cultural competence, increased knowledge of how to work on interprofessional teams, and increased knowledge and skill in the use of technology. The review revealed a need for objective measures to examine specific student learning outcomes related to utilizing telehealth as a service delivery method. Additionally, the review indicated a need for future research to identify best educational practices for teaching students about telehealth.

### Keywords

Telehealth, telemedicine, education, andragogy

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## Telehealth Student Experiences and Learning: A Scoping Review

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Katrina M. Serwe, PhD, OTR/L

Makayla Heindel, OTS, Isabel Keultjes, OTS,  
Hailey Silvers, OTS and Samantha Stovich, OTS  
Concordia University

United States

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### ABSTRACT

Telehealth as a service delivery model is increasing in popularity. Knowledge and use of telehealth technology will be a new mandatory learning outcome in occupational therapy curriculums with the implementation of the 2018 Accreditation Council for Occupational Therapy Education standards. However, it is not known how healthcare programs are currently incorporating telehealth into education or which methods of telehealth education are most effective. This study addressed this gap in the literature using Arksey and O'Malley's five-step methodological process to conduct a scoping review to examine the student experience of delivering healthcare services via telehealth and related learning outcomes. The scoping review encompassed eight databases with inclusion criteria of articles that discussed student learning outcomes, telehealth or telemedicine, and the student experience of delivering telehealth services. The research team screened 955 articles, reviewed 24 full-text articles, and came to a consensus on six articles to include in the review. Findings suggested a high level of student satisfaction related to the experience of delivering healthcare services using telehealth. Results indicated that students have a variety of related learning outcomes including increased knowledge of their professional practice, increased cultural competence, increased knowledge of how to work on interprofessional teams, and increased knowledge and skill in the use of technology. The review revealed a need for objective measures to examine specific student learning outcomes related to utilizing telehealth as a service delivery method. Additionally, the review indicated a need for future research to identify best educational practices for teaching students about telehealth.

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## **INTRODUCTION**

Technology is changing healthcare delivery models. Seventy-six percent of hospitals in the United States use telehealth delivery methods to connect patients and practitioners (American Hospital Association, 2019). Telehealth is “the application of evaluative, consultative, preventative, and therapeutic services delivered through information and communication technology” and “encompasses healthcare services, health information, and health education” (American Occupational Therapy Association [AOTA], 2018, 7212410059p1).

Telehealth is not limited to hospital settings. Occupational therapists are using telehealth in a variety of practice settings serving clients across the lifespan (Cason, 2014). Examples of telehealth utilization in occupational therapy practice include delivering birth to three services (Cason, 2009), addressing physical and mental health needs of people who have suffered a stroke (Hermann et al., 2010; Linder et al., 2015), providing education in edema management (Faett, Brienza, Geyer, & Hoffman, 2013), conducting assessments for adults who have autism (Parmanto, Pulantara, Schutte, Saptono, & McCue, 2013), and delivering caregiver wellness programming (Serwe, Hersch, & Pancheri, 2018). It is clear that telehealth as a service delivery method is not going away in the future. The question that remains is, what is the best way to prepare future healthcare professionals to utilize telehealth service delivery methods as part of their practice?

Discussion of telehealth education in medical and nursing student curriculum started in the late 1990s (Alpay & Heathfield, 1997). Telehealth is often offered as part of an elective course (e.g., Bulik & Shokar, 2010) rather than integrated into the full curriculum. However, telehealth is recognized as a growing aspect of care and medical schools are encouraged to include telehealth training in their curricula (Pathipati, Azad, & Jethwani, 2016).

Allied health professions tend to encourage, but not require telehealth training in educational standards. Speech and language pathology has been a leader in telehealth service delivery; however, the Council on Academic Accreditation in Audiology and Speech-Language Pathology (2017) does not currently have required education standards related to telehealth. Similarly, physical therapy has a position paper on technology in rehabilitation which provides recommendations for physical therapy education in technology and telehealth (Greenfield & Musolino, 2012); however, physical therapy education programs in the United States do not have a telehealth requirement through the Commission on Accreditation in Physical Therapy Education (2017).

Occupational therapy is a leader in the area of telehealth education. The current 2011 Accreditation Council for Occupational Therapy Education (ACOTE) Standards have one standard that relates to telehealth, standard B.1.8. This standard requires that students “demonstrate an understanding of the use of technology to support performance, participation, health and wellbeing. This technology may include, but is not limited to, electronic documentation systems, distance communication, virtual

environments, and telehealth technology” (ACOTE, 2018, p. 19). This standard does not directly require students to demonstrate the skills required to utilize telehealth as a delivery method; however, new 2018 ACOTE standards that will be effective July 31, 2020 do make this requirement. This standard, B.4.15, requires that all entry-level occupational therapy programs at both the occupational therapist and occupational therapy assistant level prepare students to “demonstrate knowledge of the use of technology in practice, which must include: electronic documentation systems, virtual environments, and telehealth technology” (ACOTE, 2018, p. 31).

Professional trends indicate telehealth education is needed, and education trends indicate that while telehealth education is currently recommended, it will soon be required. However, it is not known how healthcare programs are incorporating telehealth into education or what best practices in this area may be. This scoping review examines this gap in the literature. The review examines the telehealth education literature through the lens of the student perspective.

## **METHODOLOGY**

The research team consisted of an occupational therapy faculty member and four masters of occupational therapy students. The team utilized Arksey and O’Malley’s five-step process for conducting a scoping review (Levac, Colquhoun, & O’Brien, 2010). In step one (Levac et al., 2010) the team identified a primary and secondary research question. First, what is the student experience of delivering healthcare services via telehealth? Second, what are student learning outcomes associated with delivering healthcare services via telehealth?

In step two (Levac et al., 2010) the team identified relevant studies through a search of eight databases: Pubmed, Cochrane, CINAHL Complete, Proquest Central, PsychoINFO, Academic Search Complete, ERIC, and OTseeker. The team also conducted a hand search of the *Journal of Occupational Therapy Education*. The team used the following search terms in each search “(telehealth OR telemedicine) AND occupational therapy AND student.”

In step three (Levac et al., 2010) the team selected studies for review. The team reviewed the titles and abstracts of all articles identified using the designated search terms. The team set inclusion and exclusion criteria for the studies. Articles were included if they discussed student learning outcomes, telehealth/telemedicine, and the student experience of delivering telehealth/telemedicine services. Similarly, the team excluded articles that did not discuss students, telehealth/telemedicine, or student outcomes in the full text.

The team created literature summary tables for all full-text articles reviewed. The team met to discuss all full-text articles reviewed to come to a consensus to include or exclude each article. The team then hand searched the reference lists of the articles included for additional articles that would fit the inclusion criteria. Initially, the team focused solely on occupational therapy student learning outcomes but later expanded to include student learning outcomes for other healthcare disciplines closely related to

occupational therapy to broaden the scope of the articles. However, to maintain the focus on occupational therapy the team maintained the original search terms. The group met to discuss articles identified from the hand search and added articles that met the inclusion criteria to the literature review table.

In step four (Levac et al., 2010), the team established criteria for charting data. The team met four times to review articles included in the literature review table and three times to search for common themes among the included articles. The literature review tables organized information from the articles to examine aspects of study design, methodology, participants, study results (with an emphasis on student satisfaction and learning outcomes, but encompassing all results), themes, salient points, and unique aspects of each article. The tables provided a framework for discussion at team meetings and facilitated a process to compare and contrast the articles. The team identified overarching themes throughout the literature set at these meetings.

In step five (Levac et al., 2010), the team summarized and reported the results by discussing the number of articles screened, reviewed, and included in the study as identified on the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA; Moher, Liberati, Tetzlaff & Altman, 2009) flowchart (see Figure 1). The team further summarized the results by organizing the included articles into charts based on the themes identified in step four. Next, the team used these theme charts to summarize and report the results of the literature search.

## **RESULTS**

The team screened 955 articles and reviewed 24 full-text articles, resulting in the inclusion of six articles with eligibility criteria for this scoping review (see Figure 1). During steps three and four (Levac et al., 2010), the team identified six study aspects to examine in detail: study design, countries, student healthcare professions, telehealth technology, student learning experience, and outcome measures related to student learning. The team identified three common themes: the ability to provide services to diverse cultural groups and underserved populations, interprofessional education (IPE), and student satisfaction. The following sections elaborate on these major findings.

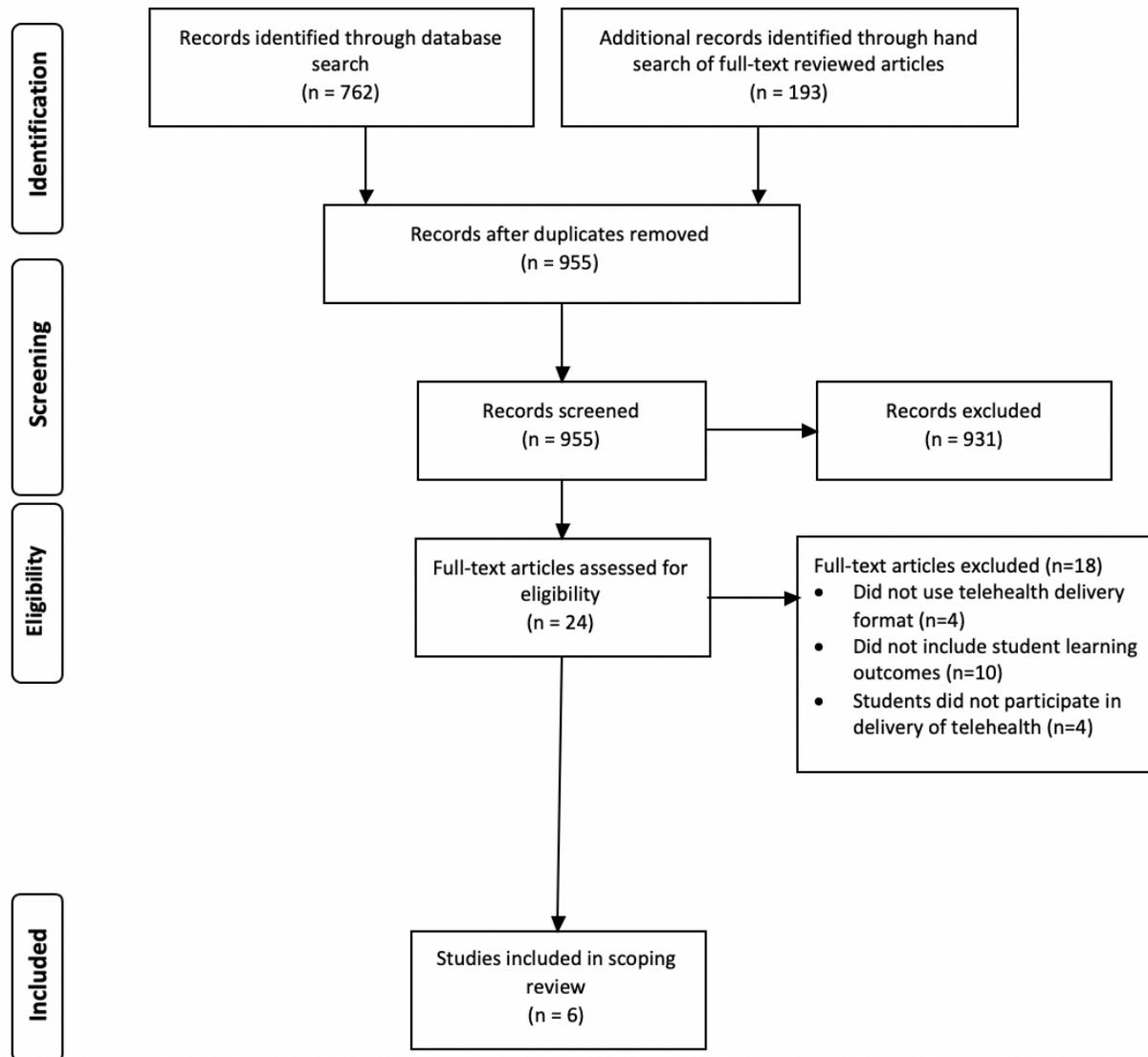


Figure 1. The PRISMA flow diagram (Moher, Liberati, Tetzlaff & Altman, 2009) demonstrates the process for selecting relevant studies.

### Study Designs

The six included studies employed a variety of study designs. Three studies used a qualitative design (Bulik & Shokar, 2010; Foti, Eleazar & Furphy, 2014; Rutledge, Haney, Bordelon, Renaud, & Fowler, 2014). Other designs included a program outcome study (Cassel & Hadley, 2016), a feasibility study (Liu & Miyazaki, 2000), and a mixed-method study (Randall et al., 2016). Each study design described student involvement in telehealth delivery of healthcare services. Table 1 provides a summary of the various study designs and results.

Table 1

*Study Design and Results Synopsis*

Design (Study)	Student Learning Experience	Student Satisfaction	Student Learning Outcomes	Additional Study Outcomes
Feasibility (Liu & Miyazaki, 2000)	Experiential	Not reported	Not reported	96% of sessions free of technical issues, increased clinical placements in rural sites, increased support for supervising clinicians, faculty supervision, & increased interprofessional education
Mixed Methods (Randall, Steinheider, Isaacson, Shortridge, Byrd, Ciro, Ross, & Loving, 2016)	Didactic, Simulation, & Experiential	Moderate to Low	Not reported	Interprofessional education
Program Outcome (Cassel & Hadley, 2016)	Experiential	High	Likert scale survey indicated student improvement in familiarity with telehealth and increased comfort working with multicultural populations	Preschool-aged clients demonstrated speech and language improvements; telehealth increased access for an underserved population
Qualitative (Bulik & Shokar, 2010)	Didactic & Experiential	High	Not reported	Not reported

Qualitative (Foti, Eleazar, & Furphy, 2014)	Experiential	Moderate	71% of students reported new learning related to technology, 57% for the occupational therapy process, & 43% for culture	Increased access for an underserved population
Qualitative (Rutledge, Haney, Bordelon, Renaud, & Fowler, 2014)	Simulation	High	Not reported	Increased access for an underserved population

### Countries

This collection of studies represented research from countries around the world. The majority of the studies (five) were in the United States (Bulik & Shokar, 2010; Cassel & Hadley, 2016; Foti et al., 2014; Randall et al., 2016; Rutledge et al., 2014), and one was conducted in Canada (Liu & Miyazaki, 2000). One study was a partnership between providers in the United States and Guatemala with Guatemalan clients (Foti et al., 2014).

### Student Healthcare Professions

The studies included students from a variety of healthcare professions. Two studies included interdisciplinary healthcare students; one involved students in rehabilitation departments (Liu & Miyazaki, 2000), and the other included students in occupational therapy, physical therapy, and nurse practitioner programs (Randall et al., 2016). One study focused on occupational therapy students (Foti et al., 2014), one involved speech-language pathology students (Cassel & Hadley, 2016), one involved medical students (Bulik & Shokar, 2010), and one involved nursing students (Rutledge et al., 2014).

### Telehealth Technology

Implementing telehealth services requires the use of both software and hardware. All of the studies, with the possible exception of one that did not specify how telehealth sessions were delivered (Randall et al., 2016), utilized videoconferencing to deliver telehealth services. Two studies used VSee software to video conference (Cassel & Hadley, 2016; Foti et al., 2014). One study used email and WhatsApp in conjunction with VSee (Foti et al., 2014). One study used Skype®, Breeze software for video conferencing (Rutledge et al., 2014). Three studies provided telehealth services using software that was not specified (Bulik & Shokar, 2010; Liu & Miyazaki, 2000; Randall et al., 2016).

Three of the six studies had participants use a personal computer for the hardware (Cassel & Hadley, 2016; Foti et al., 2014; Rutledge et al., 2014). In addition to the personal computer, one of these studies used a Logitech HD Pro Webcam C920 (Cassel & Hadley, 2016). One study used “videoconferencing equipment obtained from Raytheon Systems connected with dedicated digital lines at 0.5 T bandwidth (768 kbit/s)” (Liu & Miyazaki, 2000, p. 47). One study used an iPad® in addition to a telehealth cart with “peripheral attachments (stethoscope, otoscope, or hand-held high definition camera)” (Randall et al., 2016, p.342). Another study used a video conferencing unit with a variety of peripherals but did not specify the brand and type of peripherals (Bulik & Shokar, 2010).

### Student Learning Experience

The student learning experience with telehealth service delivery varied in each study. Studies included experiential learning via direct administration of services (Cassel & Hadley, 2016; Foti et al., 2014) and didactic learning through course content related to telehealth (Bulik & Shokar, 2010; Randall et al., 2016). Direct administration of services via telehealth encompassed teleconsultation (Foti et al., 2014) and direct therapy services (Cassel & Hadley, 2016). One feasibility study noted the student experience may include supervision, education, and client interactions; however, the study did not provide details of student client interactions (Liu & Miyazaki, 2000). Two studies incorporated telehealth simulation activities for students to increase familiarity and practice for providing future telehealth services (Randall et al., 2016; Rutledge et al., 2014). Table 2 outlines aspects of the telehealth learning experience in each study.

Table 2

#### *Aspects of the Student Telehealth Experience*

Study	Telehealth Learning Experience
Bulik & Shokar (2010)	Seven medical students completed two online elective courses on telemedicine. Students visited sites delivering/receiving telemedicine to gain the perspective of the provider and the client. Finally, students wrote a reflective paper about the experience of using telemedicine and how it affects communication.
Cassel & Hadley (2016)	Eight speech-language pathology students worked in pairs to deliver services to four preschool-age children in an underserved area via teleconferencing.
Foti, Eleazar, & Furphy (2014)	Twenty-one occupational therapy students enrolled in an adult interventions course participated in a pilot program that included teleconsultation services to clients in Guatemala who had a disability.

Liu & Miyazaki (2000)	Students and professionals in a rehabilitation medicine department (specific disciplines not specified) delivered 254 telehealth sessions. Sessions varied in duration, purpose, and disciplines involved.
Randall et al. (2016)	Nurse practitioner, occupational therapy, and physical therapy students (139 students total) participated in three semesters of coursework. First semester students completed online modules related to telehealth and interprofessional core competencies and participated in paper-based client care scenarios as a team. Second semester students practiced in a simulated environment using a telehealth cart. Third semester students delivered supervised telehealth services as an interdisciplinary team in an ambulatory care clinic.
Rutledge, Haney, Bordelon, Renaud, & Fowler (2014)	Sixty students in a post a post-master's doctor of nursing practice program participated in a workshop and simulated telehealth experience with corresponding assignments. Students completed two simulations (the first in person, the second via telehealth) with a student actor as the client. The first simulation involved a client status post stroke in a hospital setting. The second simulation involved using telehealth to meet with the client and caregiver.

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### Outcome Measures

The six included studies employed a variety of outcome measures (see Table 1). The most common student outcome measure discussed in four of the studies was increased knowledge of technology (Cassel & Hadley, 2016; Foti et al., 2014; Randall et al., 2016; Rutledge et al., 2014). Two articles included student outcomes related to increased exposure to clients in rural areas by overcoming obstacles related to distance and travel time (Bulik & Shokar, 2010; Liu & Miyazaki, 2000). One study noted the outcome of increased cultural awareness (Cassel & Hadley, 2016), while another study noted a greater opportunity for clinical consultation (Liu & Miyazaki, 2000).

The results provide insight into the benefits of including telehealth methods in the curriculum for students of various professions. These benefits fit into three main themes: ability to provide services to diverse cultural groups and underserved populations, IPE, and student satisfaction.

### Service to Diverse Cultural Groups and Underserved Populations

Two studies exposed students to diverse cultural groups and had related outcomes of increased cultural awareness. In one study, speech-language pathology students delivered services to an ethnically diverse population 60 miles away via telecommunication systems; students expressed an improvement in their level of comfort in working with multicultural populations (Cassel & Hadley, 2016). In another

study, occupational therapy students in the United States delivered services via telehealth to clients with disabilities in Guatemala. In student feedback, 43% of the participants expressed new learning related to cultural awareness after their telehealth experiences (Foti et al., 2014).

In two studies, students and therapists delivered services to clients in remote rural areas (Liu & Miyazaki, 2000; Rutledge et al., 2014). The University of Alberta connected faculty, students, and clinicians in a telehealth program serving a remote rural community (Liu & Miyazaki, 2000). This program allowed supervision of students, clinical consultations, and professional development activities to occur that otherwise may not have been possible. In another study, nursing students provided telehealth services to an underserved population in a rural community and noted this as an advantage of telehealth (Rutledge et al., 2014).

### **Interprofessional Education**

Telehealth provided opportunities for IPE between disciplines in two of the studies (Liu & Miyazaki, 2000; Randall et al., 2016). Randall et al. (2016) involved occupational therapy, physical therapy, and nurse practitioner students from two different campuses in using telehealth for a team-based service delivery to promote interprofessional learning. Liu and Miyazaki (2000) involved students on an interdisciplinary team for telehealth delivered patient care and consultation, as well as co-supervision from health professionals in-person and via telehealth. The research team also used telehealth to facilitate interdisciplinary rounds for patient-centered care (Liu & Miyazaki, 2000). While IPE was a noted benefit for two studies, student satisfaction for this method of IPE is unknown. Lui and Miyazaki (2000) did not examine student satisfaction, and Randall et al. (2016) reported moderate to low satisfaction related to the entire telehealth experience, which included three semesters of coursework and simulation in addition to experiential telehealth learning activities.

### **Student Satisfaction**

Five of the six studies focused on student satisfaction for using telehealth as a delivery method for healthcare services (Bulik & Shokar, 2010; Cassel & Hadley, 2016; Foti et al., 2014; Randall et al., 2016; Rutledge et al., 2014). Following the use of telehealth, students reported an increase in knowledge about telehealth; the majority of students expressed satisfaction while using telehealth (Bulik & Shokar, 2010; Cassel & Hadley, 2016; Foti et al., 2014; Randall et al., 2016; Rutledge et al., 2014). Two studies specifically reported that students stated they would recommend the use of telehealth to friends (Bulik & Shokar, 2010; Rutledge et al., 2014). Furthermore, two studies found that students had better attitudes and impressions of using telehealth following their experiences (Randall et al., 2016; Rutledge et al., 2014). One study found that students were able to see the value of telehealth following their experiences, specifically indicating it allowed students to assess physical conditions and allowed patients to receive access to specialists without being in the same room (Rutledge et al., 2014). These students also noted that telehealth was beneficial for checking in on patients and saving clients a trip to the provider (Rutledge et al., 2014). One study found telehealth increased learning about the occupational therapy process, culture, and technology

(Foti et al., 2014). Only one study included student reports of difficulty establishing rapport with clients and communication issues related to technology, and this is the only study to report moderate to low student satisfaction (Randall et al., 2016). Table 1 briefly outlines student satisfaction across the included studies.

## **DISCUSSION**

The six studies in this review involved a variety of study designs, countries, student healthcare professions, telehealth technologies, student learning experiences, and outcome measures. This information improves understanding of student experiences and learning outcomes from delivering healthcare services via telehealth.

### **What is the Student Experience of Delivering Healthcare Services via Telehealth?**

This scoping review indicated students were likely to have a positive experience of telehealth, with five of the six studies indicating an overall positive student experience. However, the results did not indicate which aspects may be related to a positive or negative student learning experience. Possible aspects of telehealth related to higher satisfaction among students include the opportunity to collaborate with students from other disciplines, gain clinical and cultural experience, learn new skills, and provide services to medically underserved clients. The study with the lowest student rating in this review included didactic, simulated, and experiential learning components, and results indicated students had communication issues related to technology, were concerned with the added complexity involved in client interactions during telehealth sessions, and reported more difficulty establishing client rapport in telehealth sessions (Randall et al., 2016). A survey of speech and language pathology clinical supervisors also expressed this concern of students' increased difficulty establishing client rapport in telehealth sessions (Overby, 2017). However, Serwe and Bowman's (2018) study of the client experience of student telehealth delivered services indicated good rapport between clients and students. Lower satisfaction among students could also be attributed to general challenges with the use of telehealth technology. Educators need additional research to understand factors that contribute to a positive telehealth learning experience and how students' perceived ability to establish rapport with clients is affected by telehealth service delivery methods.

The six studies in this review involved students in a variety of didactic, simulated, and supervised telehealth service delivery experiences. Student satisfaction was high in most studies, and students rated both real and simulated telehealth experiences highly. However, only two studies included a simulated aspect (Randall et al., 2016; Rutledge et al., 2016) and one of these studies also included telehealth service delivery to a real client following the simulation experience (Randall et al., 2016). Results do not allow for determination of a superior format for telehealth service delivery in respect to student satisfaction.

### **What Are Student Learning Outcomes Associated with Delivering Occupational Therapy Services via Telehealth?**

Many of the studies in this review did not report specific student learning outcomes. Reported learning outcomes were subjective (e.g., surveys, written reflections, and presentations). Two studies utilized student self-report of learning as an outcome (Bulik & Shokar, 2010; Foti et al., 2014). Student self-assessment may be a learning tool but is not regarded as an accurate assessment of learning (Taylor, 2014).

Studies in this review did not include objective, quantitative measures related to student learning; however, qualitative measures did reveal that students learned about telehealth technology, the process of delivering their respective healthcare services, and about their client populations. Increased knowledge of technology may encourage students to utilize telehealth as a service delivery method. Students may be more efficient in technology use and may be more ethical in their use of technology as their awareness of technology related security issues increases.

Studies in this review employed a variety of hardware and software technologies to deliver services. It is unclear from this review which types of hardware and software may be most beneficial for student learning. Telehealth services may be provided synchronously or asynchronously (AOTA, 2018). Most studies in this review provided synchronous telehealth services via videoconferencing. It may be important for educational programs to introduce students to secure methods of videoconferencing for telehealth service delivery.

This scoping review revealed common uses of telehealth services by healthcare students and professionals to communicate with members of different disciplines (Liu & Miyazaki, 2000; Randall et al., 2016). This is advantageous as it allows healthcare professionals to collaborate regarding complex diagnoses and it ensures goals and treatment plans are aligned for a particular patient. Due to advances in technology, occupational therapy, physical therapy, nurse practitioner, and other healthcare students are now able to provide team-based service delivery from different campuses (e.g., Randall et al., 2016). Telehealth services also allow students to more easily receive co-supervision from healthcare professionals (e.g., Liu & Miyazaki, 2000). These findings show the importance of further use and research on the implications of telehealth on IPE and teamwork, particularly for future healthcare education.

Studies in this review provided a variety of benefits not directly related to the student experience or student learning outcomes. A beneficial outcome of telehealth is the ability of professionals to provide services to individuals living in remote areas who may not otherwise seek or have access to healthcare services. If individuals in remote areas were to seek in-home care to address their needs, healthcare professionals would need to spend much of their time traveling to these remote destinations. Through the use of telehealth services, healthcare professionals can reduce travel time and, therefore, increase the number of patients they are able to treat in a typical workday (Cason, 2009).

Another beneficial aspect of telehealth is the ability to support fieldwork educators and students in distant locations through faculty or other mentor supervision and consultation without requiring travel to the destination (Liu & Miyazaki, 2000). New fieldwork educators or fieldwork educators with a student who is struggling can receive support from university faculty or other mentors, and students in non-traditional placement settings may receive some supervision and advising via telehealth. This option would also help students feel greater support and allow them to seek assistance throughout their educational experiences more easily.

### **Limitations**

A limitation of this review involves the level of evidence provided by the included studies. The research designs reflect emerging evidence, including feasibility, program outcome measures, qualitative, and mixed-method designs. These research designs are important starting points, but provide a low level of evidence (Tomlin & Borgetto, 2011). This review is limited by the lack of detail related to the student learning experiences and outcome measures. Outcome measures were subjective and lacked rigor in examining specific learning outcomes. Furthermore, the studies provided limited detail on specific hardware and software used to deliver services. The small number of studies and limited outcome measures do not elucidate best methods for teaching telehealth.

### **Future Research**

This study provides general information about student learning outcomes but does not identify outcome measures to assess telehealth learning experiences. Future research can measure student satisfaction using more rigorous methods. Future research should examine specific student learning outcomes such as assessment of specific knowledge and skills. Studies should incorporate objective and standardized outcomes measures when possible. For example, the Telehealth Usability Questionnaire is a potential tool with established reliability and validity that could examine students' perceptions related to use of a specific telehealth technology (Parmanto, Lewis, Graham, & Bertolet, 2016). The Technology Profile Inventory is another potential tool that can examine students' attitudes toward technology before and after a telehealth experience (DeYoung & Spence, 2004; Spence, DeYoung, & Feng, 2009).

Future research should examine various educational methods to teach students about telehealth including didactic and experiential learning and simulated versus in vivo telehealth service delivery, including the impact of telehealth on students' abilities to establish rapport with clients. Future research can further examine the promising themes identified in this review, including the ability to increase cultural competence in students, and opportunities for interprofessional interactions and educational experiences.

### **IMPLICATIONS FOR OCCUPATIONAL THERAPY EDUCATION**

Knowledge and use of telehealth technology is a new mandatory learning outcome in occupational therapy curriculums that will be effective in July of 2020 when the 2018 ACOTE standards go into effect. This study indicates there is some research available

to inform implementation of telehealth education into occupational therapy curriculums. Current research indicates students typically have a positive experience of telehealth and learning outcomes can dovetail with other learning objectives such as knowledge of the profession, interprofessional practice, and cultural competence. Telehealth education can include didactic, simulated, and experiential learning components. However, optimal educational delivery models and specific learning outcomes are yet to be identified.

## CONCLUSION

This scoping review provides evidence to support the implementation of telehealth into healthcare education, as it offers favorable benefits for students, healthcare professionals, and clients. Three qualitative studies, one program outcome study, one feasibility study, and one mixed-method study offered insight regarding student learning outcomes and experiences from delivering healthcare services via telehealth. Results indicate that students have a positive experience of telehealth with a variety of related learning outcomes including increased knowledge of their professional practice, increased cultural competence, increased knowledge of how to work on interprofessional teams, and increased knowledge and skill in the use of technology. Further evidence related to optimal educational delivery models and specific learning outcomes are needed to better support the implementation of telehealth in educational healthcare practices. The evidence in this review is valuable to occupational therapy practitioners and educators. This collection of literature highlights the value of telehealth as a delivery method for occupational therapists and shares insight into how to prepare students to provide services via telehealth. Telehealth is a growing aspect of healthcare with promising outcomes; consequently, the proper student training is vital for future healthcare providers.

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