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Preparing Speech–Language Pathology Graduate Students for Effective Telepractice

Recommended Knowledge and Skills

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Telepractice has been recognized as an efficacious service delivery model for more than 15 years. Yet, most speech-language pathologists found themselves ill-prepared to transition in-person clinical services to a digital format in response to the pandemic. Confusion regarding telepractice regulatory, reimbursement, technology, and delivery requirements stemmed from a lack of formal training, as most practicing clinicians lacked graduate preparation in this arena. Graduate speech–language pathology programs were stymied as to specific telepractice knowledge and skills that should be incorporated into a preparatory program. This article outlines a set of telepractice competencies to guide graduate programs and to promote self-evaluation among practicing clinicians. The specified competencies are clustered into three domains: (1) regulatory, reimbursement, and ethics; (2) telecommunications technology; and (3) clinical telepractice. Examples of knowledge and skills specific to each competency are provided. Infusion of the telepractice competencies within the curriculum of three accredited graduate programs is illustrated. **Key words:** *speech–language pathology education*, *telepractice best practices*, *telepractice competencies*, *telepractice education*

TELEPRACTICE is not a novel service delivery model invented in response to the pandemic. The American Speech-Language-Hearing Association (ASHA) has recognized the appropriateness of telepractice since 2005, and telepractice was added to the directory of special interest groups in 2011 (ASHA, n.d.c). However, the adoption of this telecommunications-based model has been tempered by many factors, most notably a dearth in reimbursement for speech–language services delivered via telepractice. The coronavirus disease-2019 (COVID-19) pandemic forced clinicians to abruptly shift from in-person services to telepractice. However, few clinicians were prepared to make the digital leap, as a scant 5% of ASHA speech–language pathology certificate holders reported routinely using telepractice prepandemic (ASHA, 2020). Confusion regarding technology requirements for transitioning clinical services to an online format, the overwhelming onslaught of digital therapeutic resources, and an ever-changing regulatory and reimbursement landscape were challenging factors.

Like their professional counterparts, graduate speech–language pathology students and

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their programs were not impervious to the rapid conversion to telepractice. By late spring 2020, most training programs had closed their in-house clinics, and students were being sent home from community clinical rotations. To avoid deleterious effects on students' educational progression and client care, many programs elected to pivot to telepractice only to find themselves baffled about how to adjust their curriculum to accommodate this underutilized delivery model. Prior to the pandemic, most graduate academic training programs offered little education in telepractice (Behl & Kahn, 2015; Grogan-Johnson et al., 2015; Wilson & Seal, 2015).

The pandemic has provided an optimum opportunity to eradicate the gap in clinical training in telepractice. Clinician-cited confusion in making the telecare leap testifies to the importance of infusing telepractice into graduate curricula and is supported by expert opinions and research (Cohn & Cason, 2016; Hall-Mills et al., 2021; Keck & Doarn, 2014; Overby, 2018; Overby & Baft-Neff, 2017). Although much similarity exists between in-person and telepractice models, the virtual nature of telepractice presents new legal and regulatory requirements, ethical responsibilities, and a heightened level of technological literacy and competency that is not reflective of traditional in-person service delivery. If students are to effectively use telepractice in accordance with the standards for the Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) as defined by the Council for Clinical Certification in Audiology and Speech-Language Pathology of ASHA (2018), then graduate programs must deliberately infuse telepractice-specific knowledge and skills into their traditional training programs.

The purpose of this article is to provide guidance to training programs about specific knowledge and skills required of entry-level teleclinicians. Although student clinicians are the primary focus, the recommendations also are applicable to practicing clinicians seeking self-evaluation, and to administrators responsible for personnel development. We begin by outlining basic knowledge and skills (hence referred to as telecompetencies) within the domains of legal and ethical requirements governing telepractice, telecommunications technology, and clinical practice. The curriculum description is followed by examples of three diverse models for preparing students in telepractice in accordance with ASHA guidelines.

TELECOMPETENCIES

The telecompetencies are an amalgamation of recommendations from ASHA's Telepractice Portal (ASHA, n.d.a), ASHA's Telepractice Knowledge and Skills (ASHA, 2005), *A Blueprint for Telerehabilitation Guidelines* (Brennan et al., 2010), the *American Telemedicine Association's Principles for Delivering Telerehabilitation Services* (Richmond et al., 2017), published works (Hall et al., 2019; Houston, 2013; McCarthy, 2013), and our combined 27 years of successfully preparing students in telepractice. Upon inspection, program faculty will note parallels between their current didactic and clinical education content and the telecompetencies. For practicing clinicians, the telecompetencies complement clinical practice.

The specific telecompetencies are organized into three domains. The authors selected broad domain labels to allow for pragmatic grouping of the discrete telecompetencies while adhering to the recommendations of previously noted professional organizations (e.g., ASHA and American Telemedicine Association [ATA]) and published works (e.g., Brennan et al., 2010; Hall et al., 2019; Houston, 2013). The domains are presented in a "quasi" linear order, meaning *Domain 1: Regulatory, reimbursement, and ethics* influences the selection and use of technology as outlined in *Domain 2: Telecommunications technologies*, and provider/client technology access and competence influence *Domain 3: Clinical*

practice. We describe the linear process as "quasi" because telepractice education is a dynamic process with interactions occurring among the discrete competencies.

Domain 1: Regulatory, reimbursement, and ethics

Training should focus first on educating students about the regulatory, reimbursement, and ethical guidelines of telepractice prior to clinical practice as specified by the telecompetencies in Table 1. We find it beneficial to begin with a vocabulary lesson to equip students with the semantics required to accurately interpret governmental regulations and reimbursement policies. The discussion should cover the four recognized telepractice models, which are: (1) *virtual visits*, also referred to as "video-conferencing," "synchronous," "real-time audio/video," (2) *chat-based interactions,* also known as "store-and-forward," "asynchronous," or "eVisits," (3) *remote patient monitoring*, and (4) *technology-enabled modalities*, also known as "mobile health (mHealth)" and "digital therapeutics" (ATA, n.d.). See Appendix A for a glossary of terms used in this article. For a more comprehensive list of telepractice-related terminology, consult Blignault and Crane (1999).

Licensure and credentialing

ASHA guidelines affirm that a provider is responsible for adhering to licensure and credentialling requirements where they and the client are physically located at the time of service (ASHA, 2021). To prevent entry-level clinicians from unwittingly violating state, national, and international statutes, they should become savvy interpreters of licensure laws and educator credentialing, as telepractice regulations vary among regulatory bodies regarding definitions, allowable services, establishment of a new client relationship, consent and client rights, privacy and security requirements, role of support personnel, technology functioning and calibration, liability insurance, provisional credentialing for out-of-state or country providers, and supervision of students and speech–language pathology assistants (ASHA, 2021; Cason & Brannon, 2011). To remain in compliance with ASHA guidance, students should gain practical experience confirming a client's physical location prior to service delivery and feel confident to suspend services if they

Table 1. Domain 1: Regulatory, reimbursement, and ethical telepractice competencies

1.1	States licensure, liability, and malpractice laws and requirements for telepractice with consideration given to state, federal, and international requirements at provider and client locations.
1.2	Adheres to federal, state, and local regulations regarding client privacy and security including those pertaining to the physical environment and storage and transmission of client information regardless of technology and connectivity (e.g., mobile device and cloud-based services).
1.3	Uses encryption, VPN, or firewall applications appropriate to hardware, software, and connectivity to ensure confidential transmission of client information.
1.4	Collects informed consent for telepractice services and documents the telepractice encounter according to applicable regulatory requirements.
1.5	Identifies mechanisms of reimbursement and payer requirements specific to telepractice.
1.6	Complies with copyright and intellectual property laws when creating and using digital materials.
1.7	Complies with professional codes of ethics of credentialing and certifying bodies (e.g., ASHA, state licensure, and teacher credentialing) across telepractice models.

Note. ASHA = American Speech-Language-Hearing Association; VPN= virtual private network.

suspect a regulation is being violated (Richmond et al., 2017).

Within the United States, recent developments in licensure now include the Audiology and Speech-Language Pathology Interstate Compact (ASLP-IC). When implemented, the ASLP-IC will enable license portability among states participating in the compact and applies to all models of service delivery, not only telepractice. Finally, discussions should reflect a global perspective. Teleclinicians wishing to practice internationally are responsible for complying with a country's laws and regulations for the practice of audiology or speech–language pathology while adhering to their home country's professional standards, codes of ethics, and scopes of practice (e.g., ASHA, Speech-Language & Audiology Canada, and Speech Pathology Australia), including providing services with cultural and linguistic sensitivity. ASHA's State-by-State resources (ASHA, n.d.d) provide up-to-date information regarding state licensure and teacher certification and resources for audiology and speech–language pathology associations outside of the United States.

Privacy and security

Telepractice services are held to the same standards for protecting client privacy and security as are in-person services (Richmond et al., 2017). All clinical settings must have written telepractice policies and procedures in accordance with federal laws and regulations like the Health Insurance Portability and Accountability Act (HIPAA; U.S. Department of Health and Human Services, n.d.b), the Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH; U.S. Department of Health and Human Services, n.d.a), and Family Educational Rights and Privacy Act (FERPA; U.S. Department of Education, n.d.). Routine training in telepractice policies and procedures must be included in standard clinical operations. Students should develop the habit of identifying and preventing potential privacy and security violations across diverse settings. For example, are HIPAA standards maintained when using their places of residence or if a client uses public WiFi at a restaurant?

Ordained as digital natives, we find students often lack the lexicon and practical knowledge of security and encryption mechanisms (e.g., virtual private networks [VPN], malware, and firewalls). Within didactic and practical experiences, we have learned to deliberately accentuate environmental and digital solutions for minimizing breaches to physical and technical safeguards across device types and internet connections. These include using secure text messaging to send encrypted texts, installing an application to remotely delete data from a lost or stolen mobile device, and not sharing passwords to digital devices with roommates or family members. The U.S. Department of Health and Human Services offers excellent training tools specific to U.S. regulations (https://www.hhs.gov/hipaa/for-professionals/training/index.html).

Informed consent

The ASHA Code of Ethics as well as federal and state regulations require that informed consent be collected prior to delivery of any service. Didactic conversations should focus on regulatory requirements related to the content and collection of informed consent (e.g., verbal, digital signature) including the influence of client characteristics on the consenting process (Kluge, 2011). Examples of required consent elements include but are not limited to the security, privacy, storage, and disposal of client information, potential limitations of telepractice services, client's responsibilities, and right to refuse service (Kluge, 2011). Verifying client and provider identities and collecting informed consent should be staples in every telepractice experience.

Reimbursement

Reimbursement for telepractice has been one of the greatest barriers to its expansion. Prior to the COVID-19 pandemic,

school-based telepractice was advancing as there was a payment source, but much less expansion was occurring in health care and private practice sectors as Medicare did not reimburse for telepractice nor did most state Medicaid programs. In response to the pandemic, the Centers for Medicare & Medicaid Services (2021), commercial health insurers, and some state Medicaid programs have provided temporary waivers and extensions to permit access to needed services. The reimbursement landscape post-pandemic is uncertain. Therefore, we suggest taking a two-pronged approach toward telereimbursement education. First, students should learn to skillfully lobby Medicare, Medicaid, and commercial insurers to reimburse for speech–language and audiological telepractice services. Second, they must decode reimbursement policies regarding allowable client and provider locations (e.g., medical facility, home, skilled nursing facility), covered telepractice services (e.g., video, audio-only, eVisit), the status of client–provider relationship (i.e., new vs. established), and required telepractice modifiers for billing (i.e., GT, 95, GQ) including place of service (e.g., 02, 11).

Copyright and fair use

The digital nature of telepractice has opened a new world for creating, curating, and sharing engaging clinical materials. With these possibilities comes the potential to violate copyright and intellectual property laws. Conversations on this topic should address copyright (www.copyright.gov) and fair use law (https://www.copyright.gov/fair-use/more-info.html). Clinical faculty should model options for finding fair use resources such as the Creative Commons search tool (http://creativecommons.org), Flickr (http://www.flickr.com), Pixabay (http://pixabay.com), Project Gutenberg to access free e-books, and resources from government sites like the National Aeronautics and Space Administration and the Smithsonian Institution. Discussions should address the legality of converting licensed diagnostic and therapeutic materials from hardcopy to digital, and group sharing of single-user licensed materials and login credentials to purchased apps and online subscriptions.

Professional codes of ethics

Adherence to ASHA and state professional codes of ethics can be woven throughout all competencies. We have chosen to create a separate competency in recognition of the importance of ethical practice regardless of the delivery mechanism. ASHA (n.d.) requires that the "use of telepractice must be equivalent to the quality of services provided in person and consistent with adherence to the Code of Ethics (ASHA, 2016a), Scope of Practice in Audiology (ASHA, 2018), and Scope of Practice in Speech-Language Pathology (ASHA, 2016b)." According to White-Williams and Oetjen (2015), telehealth ethics considers the benefit or loss to the client in receiving telehealth services and their right to choose the service and react to dissatisfactory services. As we prepare teleclinicians, we must acknowledge new ethical questions arising from this digital act such as the therapeutic relationship and trust, outsourcing of services, continuum of liability, privacy and security, and informed consent (Kluge, 2011; Langarizadeh et al., 2017; World Health Organization [WHO], 2010). Articles by Cohn and Cason (2019), Denton and Gladstone (2005), and Meline and Mata-Pistokache (2003) are foundational reading related to telepractice ethics.

Domain 2: Telecommunications technology

Telepractice models span the interactive continuum from synchronous to asynchronous in nature. Synchronous technologies allow a provider and client to see and hear each other in real time during a session (ATA, n.d.; WHO, 2010). Commercial voice over internet protocol (VoIP) softwares like Microsoft Teams and Zoom for Healthcare are commonly adopted because they are readily available and accessed using a standard computing device. Conversely, an asynchronous or store and forward model

Table 2. Domain 2: Technology telepractice competencies

2.1	Selects hardware and software appropriate for delivering services according to the purpose of the telepractice encounter.
2.2	Uses hardware and software features without interfering with service provision (e.g., audio-video settings, screen share, eTools, and document sharing).
2.3	Solves technical problems occurring on the provider's side and/or client's side of the interaction including using alternate means for communication.
2.4	Demonstrates ability to manage accounts, personal settings, and privacy/security controls of hardware and software, including recorded sessions.
2.5	Adheres to hardware, software, and internet protocols for ensuring private, secure, and encrypted transmission and storage of client information (e.g., firewalls, bandwidth, and malware).
2.6	Provides telepractice services across platforms as well as on mobile web-based devices.

allows the provider and the client to independently save and view information, such as photographs and videos, through a secure channel like email or a patient portal (ATA, n.d.; WHO, 2010). Given the utility of the two models, students must be competent in using technologies best suited to delivering the necessary clinical teleservice. These competencies are contained in Table 2.

Technology hardware and software applications

Telepractice technology is growing exponentially with no foreseeable expectation of slowing down. Preparing students across the breadth of technology options is time and cost prohibitive. Instead, they should graduate prepared to handle the basic technology requirements of synchronous and asynchronous services (Crutchley et al., 2014; Overby & Baft-Neff, 2017; Pramuka & Van Roosmalen, 2009; Richmond et al., 2017). At minimum, these include proficiency in using a computer, a microphone, speaker, webcam, VoIP software, and sending/receiving encrypted emails with attachments. Students should be exposed to hardware options for improving session quality and interaction. Headsets, external microphones, lapel microphones, external speakers, and add-on webcams can improve audio/video quality while accommodating a client's physical, sensory, and/or communication needs (Pramuka & Van Roosmalen, 2009; Simacek et al., 2021; Weidner & Lowman, 2020). For example, a lapel microphone can be attached to a client's shirt collar for improved audio quality during a remote clinical swallowing evaluation (Ward et al., 2014). Large-screen, high-definition monitors deliver high-resolution images, and multiple monitors offer a larger visual field. Document cameras and digital tablets can expand clinical services. A document camera permits sharing of hard copies of testing materials, books, and manipulatives. Digital tablets, when shared through the VoIP platform, grant access to commercial apps. Finally, some clinical services will require the clinician to have access to multiple live video feeds. Multiple viewing angles are beneficial when observing a client's response to a receptive test item (Anderson, 2014) or selection of an icon on an augmentative communication device (Simacek et al., 2021). Additional cameras may be required on both ends of the tele-exchange. Practice is the best way to develop competence in camera placement and switching between cameras (e.g., second webcam and mobile device).

Mastery of the videoconferencing platform will improve the delivery of telepractice services. Available VoIP platforms vary in their quantity and types of built-in features such as screen sharing, remote mouse control, eTools (e.g., pointers, markers, textboxes, and shapes), virtual backgrounds, breakout rooms, participant reactions, integrated apps, and recording. Students should utilize the

Table 3. Example software used in support of telepractice

Software	Developer	Shared Data	Compatible With	Recording
Zoom for Healthcare	Zoom	Audio, video, screen sharing	Windows, Mac, tablets, mobile devices	Yes
Doxy.me	Doxy	Audio, video, screen sharing	Windows, Mac, tablets, mobile devices	No
Microsoft Teams	Microsoft	Audio, video, whiteboard, desktop screen	Windows, Mac, tablets, mobile devices	No
Skype	Microsoft	Audio, video, computer screen (premium only)	Windows, Mac, tablets, mobile devices	No (requires external software)
Cisco WebEx	Cisco	Audio, video, whiteboard, desktop screen	Windows, Mac, Linux, mobile devices	Yes
Google Hangouts	Google	Audio, video, file transfer	Windows, Mac (video and voice plug-in only)	No (requires external software)
Adobe Connect	Adobe	Audio, video, file transfer, presentation slides	Windows, Mac, Linux, tablets, mobile devices, virtual environments	Yes
GoToMeeting	Citrix Systems Inc.	Audio, video, document sharing	Windows, Mac, tablets	Yes
FaceTime	Apple	Audio, video	Mac and Apple devices (iPad, iPod, iPhone)	No (requires external software)
Email	Various	Text, file transfer	Windows, Mac, Linux, mobile devices, tablets	No

training videos and online materials published by VoIP vendors to develop proficiency in using software features. In Table 3, a partial list of software products has been assembled with brief descriptions.

Technology troubleshooting

Providers must be prepared to efficiently manage and correct telecommunication problems that may occur during telepractice (Hall-Mills et al., 2021; Overby, 2018; Overby & Baft-Neff, 2017; Page et al., 2021). The hardware, software applications, and VoIP adopted by a graduate program and used by clients will dictate the troubleshooting skills taught. Ideally, information technologies (IT) services will be accessible to the clinician and client when technology solutions exceed common audio, video, and software adjustments (Jarvis-Selinger et al., 2008; Richmond et al., 2017). Commonly occurring technological problems include but are not limited to malfunctioning or incompatible hardware and software applications and insufficient or interrupted internet connectivity (Anderson et al., 2014; Behl & Kahn, 2015; Tucker, 2012). Based on our experiences, the most common solutions to failed or inadequate videoconferencing experiences include unmuting the audio/video feed, increasing the volume, uncovering the camera lens, turning the device on, plugging the device in, changing batteries in Bluetooth devices, rebooting the device, and updating software. At times, web-based variables are the culprits. In these instances, a change in internet browser, clearing web cache and cookies, and adjusting privacy settings on either the

computing device or software can solve disruptions. Insufficient bandwidth may result in freezing or dropping of the audio/video feed, creating audio/video jitter, or extending lag time between clinician–client responses. A troubleshooting checklist with common tips organized by device type is a practical approach to troubleshooting. The checklist helps to reduce anxiety and improve decision-making when glitches arise.

Managing privacy, security, and encryption

As noted in Domain 1, graduate programs must prepare students to adhere to federal, state, and local regulatory standards. Hardware, software applications, and internet connections will require different physical and technology safeguards for managing client privacy, security, and encryption. Clinical training programs must have policies and procedures applicable to telepractice for maintaining privacy, security, and confidentiality of all participating parties. Programs are encouraged to consult with their IT department and university HIPAA officer. Students should be required to adhere to the videoconferencing platform's privacy and security guidelines, which may include a virtual waiting room, generation of password-protected links, and unique user accounts. When selecting software applications, students should be taught to investigate the type of user information collected and how the information is stored and shared with other users. Finally, many software applications used in telepractice have the option to record client responses or the telesession whereas others may require additional software. The student must maintain HIPAA compliance when creating, storing, transmitting, and disposing of client information, regardless of the format (U.S. Department of Health and Human Services, n.d.b).

Technology proficiency

We have found it beneficial to require students to demonstrate technology proficiency with a clinical preceptor prior to delivering services. The competency check covers adherence to privacy and security requirements, use of VoIP features, and basic troubleshooting skills. Table 4 provides an excerpt from the first author's checklist.

Domain 3: Clinical practice

The clinical practice telecompetencies presented in Table 5 have been organized into subcategories reflecting the three phases of a tele-encounter: preparation, delivery, and evaluation. Students tend to go through stages of developing clinical competencies in telepractice, as they learn to effortlessly use telecommunications to deliver services while adhering to regulatory and reimbursement requirements and professional codes of ethics. In the following sections, we discuss the telecompetencies according to the three phases of clinical practice.

Preparation: Dedicated space and support

Like in-person clinic space, graduate training programs must dedicate private space to telepractice. Within the room, visual distractions should be eliminated, the room should have adequate lighting, and possible sources of audio interference or background noise controlled (Henry et al., 2017; Krupinski & Leistner, 2017). The room should be equipped with the appropriate telecommunication technologies including a telephone to aid in student–client communication, and sufficient storage and workspace. Finally, ongoing and responsive IT support must be available for troubleshooting.

Tele-etiquette

Students must learn the nuances of professional conduct as presented on a computer screen. Referred to as tele-etiquette, students should establish the optimum physical environment (e.g., lighting, privacy, and uncluttered neutral screen background) and screen presence (e.g., good lighting, visibility, audio, and interpersonal skills) while assuring client privacy and confidentiality

Table 4. Excerpt from the Zoom competency checklist used in the first author's telehealth program

Zoom Feature	Scenario
Chat feature	It is the beginning of a therapy session, and all three kindergarten students are present. You want to ask the e-Helper about one of the children's behavior. Use the chat feature to ask.
Reactions: Raise hand	You are working with two children each in different locations. You are describing an object and the children are to provide a label for the object. To respond, the child must raise his or her hand and wait for you to call on him or her.
Passing and retrieving remote control, using whiteboard and eraser	Research has shown that pairing the phoneme with the grapheme improves the effects of phonological awareness instruction. In this lesson you and the children are using the whiteboard to write the first sound heard in a word. Use the whiteboard feature to model the "my turn, our turn, your turn" approach for teaching alliteration using the words: cat, cow, can.
Sharing documents with child (i.e., screen share)	A student is learning to identify the main idea of a passage. Upload and share the document labeled "Main Idea" with the student.
Using highlighter and erase annotation tools	While sharing the main idea document, highlight information in the first passage that you used to formulate the main idea. On the next passage, take turns highlighting relevant information. Erase all highlighting before ending the activity.

(Akamoglu et al., 2018; Gustin et al., 2020). Novice clinicians tend to focus most of their attention on navigating the technology and often report feeling uneasy about establishing interpersonal relationships with clients during initial telesessions (Hall-Mills et al., 2021; Henry et al., 2017; Overby, 2018; Overby & Baft-Neff, 2017). As students accrue telepractice experience, we have observed that the interpersonal relationship also develops. The increase in tele-etiquette behaviors is aided by increased confidence in their ability to efficiently remedy technology disruptions. New telepractitioners should have the troubleshooting checklist readily available to respond to within-session technology glitches. As with in-person service delivery, a supervisor will need to be present to help resolve unexpected malfunctions.

Client selection

The first step in clinical management is to determine a client's suitability for telepractice. Several client-related characteristics must be taken into consideration, including the client's sensory/physical characteristics and cultural, linguistic, and socioeconomic background to determine whether modifications and/or accommodations are feasible within a telepractice model (ASHA, n.d.c; McCarthy, 2013; Pramuka & Van Roosmalen, 2009; Richmond et al., 2017). Client candidacy also entails an assessment of the client's physical environment (e.g., privacy and lighting), equipment, and internet connection to ensure secure high-quality telepractice sessions (Richmond et al., 2017). For example, a client's physical limitations may necessitate the use of an external mouse over a trackpad to navigate a telesession. Other clients may lack financial resources to purchase equipment and thus benefit from a technology loaner program. The need for and availability of technologically competent personnel (e.g., eHelper and caregiver) to facilitate the session should be considered in client candidacy.

Use of support personnel

Many telepractice sessions are reliant on support personnel to facilitate sessions (Behl

Table 5. Domain 3: Clinical practice telepractice competencies

Tele-etiquette	
3.1	Arranges environment at local and distant sites to maximize provider–client exchange (e.g., lighting, background, and ambient noise).
3.2	Assures privacy and confidentiality of services through careful location and screening of computer on provider and client sides.
3.3	Develops and modifies rapport to engage client and/or to support personnel across tasks (e.g., eye contact, verbal descriptions, and prosody).
3.4	Implements best practices associated with cultural and linguistic variables that could affect effective communication in a digital environment.
3.5	Develops intake/discharge documents and client on-board materials that support telepractice implementation (e.g., troubleshooting guides, home technology worksheet, and expectations).
Client selection	
3.6	Demonstrates an understanding of the potential impact of client characteristics on his or her ability to benefit from telepractice and provides modifications or accommodations as appropriate (e.g., physical and sensory, cognitive, motivational, and communication).
3.7	Demonstrates an understanding of the potential impact of the client's resources on his or her ability to benefit from telepractice and provides modifications or accommodations as appropriate (e.g., availability of technology, broadband, environment, and eHelper).
3.8	Demonstrates an understanding of the potential impact of cultural and linguistic variables on the client's ability to benefit from telepractice and provides modifications or accommodations.
Use of support personnel	
3.9	Provides appropriate training to support personnel in the delivery of services via telepractice.
3.10	Establishes a relationship with support personnel to assist him or her to provide coaching support for the e-Learner within the telepractice session.
3.11	Provides opportunities for family, caregivers, and others to observe and participate in telepractice sessions when appropriate.
Assessment and intervention	
3.12	Selects and administers formal and informal diagnostic tools via telepractice.
3.13	Applies appropriate criteria for determining the reliability and validity of assessment procedures performed via telepractice.
3.14	Develops and uses digital materials and physical manipulatives that are appropriate for stated goals for the client to receive optimal services at a distance.
3.15	Demonstrates flexibility in adjusting preplanned lessons to meet a current need within a telepractice session.
3.16	Implements and adjusts behavior management techniques to meet a current need within a telepractice session.
Evaluation of effectiveness and outcomes	
3.17	Assesses the impact telepractice may have on the validity and reliability of assessment tools and evidence-based treatment protocols.
3.18	Evaluates the quality of care delivered via telepractice including access to care, timeliness of care, continuity of care, coordination of care, and comprehensiveness of care.
3.19	Collects and analyzes clinical outcomes data to support reimbursement for telepractice services.

et al., 2017; McCarthy, 2013; Ross et al., 2016). Support personnel can include family members, caregivers, other licensed professionals, and organization-specific staff. Clinicians must teach support personnel to properly navigate the technology, assist with basic troubleshooting strategies, manage client behavior, and assist in carry-over activities (Douglass et al., 2021; Overby, 2018; Richmond et al., 2017). When permitted, support personnel also may require training to coach the client to enhance skills and strategies that are taught (Behl et al., 2017; Blaiser & Behl, 2016; McCarthy, 2013). Support personnel, like the student, must adhere to privacy and security rules.

Delivery: Assessment and intervention

Adapting assessment to the telepractice environment requires forethought and advanced planning. Rather than starting from the appropriate theoretical model, we frequently find that students allow the technology to dictate the clinical assessment. They must be taught to consider environmental and technological accommodations to testing materials and procedures, including the use of support personnel (McCarthy, 2013, Richmond et al., 2017). Adaptations may include using multiple cameras, supplementing videoconferencing with a store/forward model for speech, language, play, or voice sampling, and mailing testing materials to the client's location (Anderson, 2014; Hill et al., 2006; Raatz et al., 2019; Waite et al., 2010). Students must learn to problem solve the evaluation process over a computer while not jeopardizing the validity and reliability of the results. Further, documentation should reflect that the assessment, analyses, and interpretation were conducted via telepractice, including adaptations made to test administration and possible implications for the validity and reliability of test results.

Following the evaluation, students apply the results to develop plans of care with goals and objectives that address each client's communication needs. While goal setting is like the process used in in-person service delivery, the selection of appropriate therapy materials can be overwhelming in the telepractice model (Hall-Mills et al., 2021; Overby, 2018; Overby & Baft-Neff, 2017; Page et al., 2021). Students have access to a vast number of static and dynamic digital therapy materials to generate highly creative and personalized therapy activities that conform to evidence-based treatment protocols. An example of a static therapy activity is an I-Spy worksheet displayed on a shared screen where a child may respond using her eTool pointer. A dynamic digital activity might involve the student adapting an existing website video, such as a virtual tour of a local restaurant, to target the language an adult uses in his everyday life. We have observed and the literature notes (Overby, 2018; Overby & Baft-Neff, 2017; Page et al., 2021) that students can become overwhelmed by the plethora of digital resources and thus initially require high levels of support to select materials in accordance with evidence-based practice. Beginning clinicians typically develop therapy activities that comprise simple static materials requiring less sophisticated technology. As their telepractice skills advance, the students develop more complex dynamic activities that are highly engaging for their clients. It is important to note that dynamic activities are dependent upon the equipment and internet speed available at each site.

Evaluation: Assessment of outcomes

ASHA clearly states that telepractice services must be of equal quality to in-person services. Students must monitor their adherence to evidence-based treatment protocols and client outcomes within a digital service delivery model. Students should learn to adapt in-person procedures for assessing the effectiveness of the teletreatment program on clinical outcomes (ASHA, n.d.c, Hall-Mills et al., 2021; McCarthy, 2013; Page et al., 2021). The efficacy of telepractice should be documented in daily progress notes with additional notation regarding the audio/video

quality, the location of each remote site, and the presence of support personnel.

MODELS OF TELEPRACTICE PROGRAM IMPLEMENTATION

Three well-established telepractice training programs in the United States are presented to illustrate the practical implementation of the presented telecompetencies within accredited speech–language graduate programs. The innovative programs stem from work by each of the contributing authors to address access barriers to speech–language serves by bridging the telepractice training-to-practice gap at their respective universities prior to the pandemic. Combined, the programs represent 27 years of experience training graduate students in telepractice.

The University of Kentucky, Linking Kids to Speech-Language Pathologists

The Department of Communication Sciences and Disorders at the University of Kentucky houses Linking Kids to Speech-Language Pathologists (LinKS), a personnel development project funded by the U.S. Department of Education, Office of Special Education Programs (OSEP; Lowman, 2016-2022, H325K160050; Lowman, 2017). The LinKS mission is to alleviate personnel shortages in rural schools by preparing future clinicians to deliver high-quality telepractice services. The program is unique because training extends beyond the clinical act of telepractice to include education in developing sustainable telepractice programs within the context of an organizational system. Since 2016, eight graduate students each year have completed this specialized training during the second year of their six-semester graduate program. Courses are delivered using a hybrid distance education model. Students have access to two state-of-the art telepractice rooms, a technology lending library, and digital evaluation and therapy materials.

The first course in the LinKS curriculum covers the basic tenets of telepractice that include regulatory, licensure, and ethical factors; client selection, tele-etiquette, support personnel, and telecommunication technologies. Telepractice simulations, delivering training to support personnel, and creation of family support documents provide practical experiences. The second course is offered in the following semester and focuses on the application of telepractice strategies and technologies to the delivery of evidence-based clinical services to children presenting with disorders across ASHA's Big Nine communication disorders categories (https://www.asha.org/Events/SLP-Summit-Glossary/). In addition to the coursework, pairs of students deliver services to a child in the home via telepractice.

During the last semester, a full-time school externship with telepractice embedded is the capstone experience in the LinKS curriculum. A seminar supports the mixed in-person/telepractice rotation while providing structured instruction on the business aspects of telepractice. Over the course of the seminar, students develop a business plan for a mock telepractice company. Students report benefitting from the scaffolded nature of the three telepractice experiences (simulations, pairs, and independent) they receive in the curriculum. The diversity of the experiences (clinic, home, and school) forces them to identify and address setting-dependent variables impacting the efficacy and efficiency of telepractice.

LinKS served as the impetus to our comprehensive 9-credit interprofessional Telehealth Graduate Certificate. Preservice students and practicing professionals in health care-related professions receive robust education in telehealth applications to persons across the lifespan, settings, and disorders. The interprofessional nature of the certificate creates a rich learning context that fosters interprofessional practice within telehealth.

University of Maine, Speech Therapy Telepractice Training Program

The University of Maine's Speech Therapy Telepractice Training Program was established in 2012 in response to the unmet

need for speech therapy services in Maine with the aim of increasing accessibility to services using technology in accordance with state and federal laws. Given the current COVID-19 pandemic, the development of the program was timely and serves as a model of best practices in telepractice training in academic institutions nationwide. The mission of the telepractice program focuses on using technology to overcome barriers to speech therapy services, such as rural geography, limited transportation, and inclement weather, while training future speech–language pathologists to use this service delivery model. The program resides within the Department of Communication Sciences and Disorders' on-campus speech, language, and hearing training center and consists of two state-of-the-art-equipped telepractice rooms, one conference seminar room, one research laboratory, and on-site supervisor offices. Individual and group sessions are provided using the Cisco WebEx video conferencing platform that permits synchronous services under 100% supervision from clinical supervisors trained in speech therapy telepractice.

The telepractice program utilizes a rigorous three-component experiential learning pedagogy that promotes the development of telepractice clinical skills. The first learning component is a week-long intensive training experience composed of lectures, laboratories, simulations, and hypothetical case presentations. During this time, students learn about telepractice technology, applications for speech and language evaluation and treatment, training support personnel, digital documentation, troubleshooting, ethical considerations, reimbursement, and rules and regulations pertaining to telepractice. Following the intensive training, the students engage in a second learning component consisting of a semester-long supervised telepractice clinical practicum where newly acquired skills are applied to a full caseload of 10–12 child and adult clients with a variety of disorders within different remote settings, such as K-12 schools in Maine, an international school in Fiji, individual homes, residential group homes, day treatment programs, and long-term care facilities. Therefore, the graduate students have diverse experiences where they learn to develop telepractice intervention programs that are appropriate for clients of different ages, disorders, remote settings, and cultural/socioeconomic backgrounds. The third learning component consists of a weekly seminar to promote peer learning. During these meetings, specific topics are discussed related to telepractice, cultural diversity, clinical procedures and rules, and regulations and ethics governing telepractice service delivery. Students give case presentations and share learning experiences that foster the development of skills through examples. Readers can refer to the *University of Maine, Speech Therapy Telepractice and Technology Program Manual* (Walker, 2015) for details of the training model, technology, clinical forms, and methods used in the training program.

University of Akron, the Telepractice & eLearning Laboratory

The Telepractice & eLearning Laboratory (TeLL) was established in 2011 within the Audiology and Speech Center in the School of Speech-Language Pathology and Audiology at the University of Akron. Graduate students participating in the TeLL develop knowledge and clinical competencies in meeting the listening and spoken language needs of young children with hearing loss through family-centered early intervention services and, at the same time, learn to deliver services through in-person, telepractice, and hybrid models. In 2012, the Graduate Studies Program in Listening and Spoken Language (GSPLSL), funded through a personnel preparation grant (Houston, 2012-2018, H325K120356) from the OSEP at the U.S. Department of Education, was established to provide specialized training to graduate students in meeting the communication needs of young children with hearing loss. The goal was to ensure that students could deliver appropriate services whether the families chose in-person services, synchronous telepractice

sessions, or a hybrid model. With the establishment of the GSPLSL, two new courses were added to the curriculum for graduate students funded on the grant. The first course focused on the foundational knowledge and skills of meeting the listening and speaking needs of young children with hearing loss, and the second course was devoted to the delivery of telepractice services.

Since the TeLL was established, the commitment to telepractice has permeated the graduate program. Faculty now discuss how a client with a specific diagnosis (e.g., hearing loss, fluency disorder, voice disorder, speech or language delay) can be served through in-person, telepractice, and hybrid models. All graduate students complete at least one semester of telepractice experience in the Audiology and Speech Center clinic with additional experiences gained through community placements, such as the local children's hospital, public schools, and private practices. Prior to the start of classes in August of each year, students attend a mandatory 3-day intensive workshop focused on telepractice. Students acquire the basic knowledge and skills of telepractice service delivery, from the types of technology used to planning and executing simulated telepractice sessions with their peers. Students assigned to the TeLL, during their in-house rotation, attend a weekly clinical seminar designed to support their telepractice clinical experience. Students discuss cases, troubleshoot technology challenges, and collaborate on developing digital activities to support the treatment goals addressed in their sessions.

CONCLUSION

Telepractice is now rooted in the clinical milieu of speech–language pathology. Clinicians and clients alike have experienced the benefits of a virtual environment. Clients now expect a digital option when scheduling appointments. Thus, to better prepare the next generation of speech–language pathologists, graduate programs must begin to cross-train students to use in-person and telepractice models, as many components of these clinical paradigms are similar. This article provides a framework for the integration of the necessary telepractice knowledge and skills into graduate education to promote uniformity across programs. As illustrated by the three telepactice training models, programs may find it necessary to adapt implementation to meet their unique programmatic and student needs. Based on the telecompetency descriptions provided, the reader can see that students are gaining valuable clinical experiences and should be able to gain clinical clock hours for telepractice sessions. We will need this support post-pandemic to sustain a digital paradigm shift.

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Appendix A. Glossary of Telepractice-Related Terms

Term	Definition	Reference
asynchronous	capture and transmission of saved images or data for later viewing or interpretation by a professional	ASHA, n.d.a
Audiology and Speech-Language Pathology Interstate Compact (ASLP-IC)	an occupational licensure compact that allows professionals to practice in multiple states without having to obtain additional state licenses	ASHA, n.d.a
Centers for Medicare &Medicaid Services	part of the U.S. Department of Health and Human Services that provides health coverage to citizens via Medicare, Medicaid, the Children's Health Insurance Program, and the Health Insurance Marketplace	Centers for Medicare & Medicaid Services, 2021
chat-based interactions	chat-based communication used by a health care provider to review protected patient health information and later deliver a consultation, diagnosis, or treatment plan	American Telemedicine Association, n.d.
encryption	the process of converting sensitive information into an unrecognizable or "encrypted" form to prevent unauthorized viewing	Christensson, 2014
eVisit	an evaluation and management service provided by a health care professional to a patient using a web-based or similar electronic-based communication network for a single patient encounter	American Academy of Family Physicians, n.d.
Family Educational Rights and Privacy Act (FERPA)	a federal law that protects the privacy of student education records	U.S. Department of Education, n.d.
firewall	an internetwork gateway that protects a network's system against threats from an "outside" or unauthorized network	National Institute of Standards and Technology, n.d.a

(*continues*)

Appendix A. Glossary of Telepractice-Related Terms (*Continued*)

Term	Definition	Reference
Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH)	federal law to promote the adoption and meaningful use of health information technology by addressing the privacy and security concerns associated with the electronic transmission of health information, in part, through strengthening the civil and criminal enforcement of the HIPAA rules	U.S. Department of Health and Human Services, n.d.a
Health Insurance Portability and Accountability Act of 1996 (HIPAA)	federal law preventing sensitive patient health information from being disclosed without the patient's consent or knowledge	Centers for Disease Control and Prevention, n.d.
malware	software application designed with malicious intent to interfere with a computing device, server, or computer network	National Institute of Standards and Technology, n.d.b
Medicaid	a federal-state assistance program that provides health coverage for low-income people of all ages	U.S. Department of Health and Human Services, n.d.c
password protected	involving a computer, website, etc. that can only be accessed with a password	Cambridge Business English Dictionary, n.d.
place of service (POS) codes	POS codes are used on claims to indicate the specific type of location where services were provided	ASHA, n.d.b
real-time audio/video	communication that takes place in real time, simultaneously	Blignault & Crane, 1999
remote patient monitoring (RPM)	the use of health technologies to capture, transmit, evaluate, and communicate patient health data from the patient's location (e.g., home) to their health care provider or team	American Telemedicine Association, n.d.
store-and-forward	sharing of patient information outside of real-time communication	Blignault & Crane, 1999
synchronous	use of real-time audio and video connections to connect a provider with a patient	ASHA, n.d.a
technology-enabled modalities	references a broad array of technologies designed for collecting, transmitting, monitoring, and managing a person's health and health care	
tele-etiquette	establishment of the optimum physical environment and use of professional communication most appropriate to synchronous encounters	Akamoglu et al., 2018; Gustin et al., 2020
telepractice	application of telecommunications technology to the delivery of speech–language pathology and audiology professional services at a distance	ASHA, n.d.a

(*continues*)

Appendix A. Glossary of Telepractice-Related Terms (*Continued*)

Term	Definition	Reference
telepractice modifiers	modifiers used in billing to indicate mode of delivery of a telepractice service	ASHA, n.d.d
unique user account	a user's unique identifier that allows them to sign in to computers, networks, and domains	Techopedia, n.d.
video-conferencing	real-time audio and video connection among people	Merriam-Webster, n.d.
virtual private networks (VPN)	computer network that provides an encrypted connection between the user and the internet	National Institute of Standards and Technology, n.d.c
virtual visits	live, synchronous, interactive encounters between a patient and a health care provider via video, telephone, or live chat	American Telemedicine Association, n.d.
virtual waiting room	a virtual place for patients to wait until a health care provider admits them into the virtual meeting room (i.e., video-conferencing meeting)	Webex, 2022